

Information seeking behaviour patterns of dental trauma patients and their parents

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BDS MSc. MFDS (Edn)

A dissertation

Submitted to University College London (UCL)

In partial fulfilment of the requirements for the degree of

Clinical Doctorate in Paediatric Dentistry

UNIVERSITY COLLEGE LONDON

EASTMAN DENTAL INSTITUTE

2011- 2014



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ACKNOWLEDGEMENTS

My sincerest thanks to Dr Susan Parekh, Professor Susan Cunningham, Dr Paul Ashley and Miss Adele Johnson for their invaluable guidance, encouragement and assistance during this project.

I am extremely grateful to my husband, parents, brothers and sisters for their support and motivation.

I would also like to extend my thanks to the Ministry of Higher Education and Saudi Cultural Bureau in London for their support, effort and giving me the chance to complete my postgraduate education in the United Kingdom.

DECLARATION

“Except for the help listed in the acknowledgements, the content of this thesis are entirely my own work. This work has been not previously submitted, in part or in full, for a degree or diploma of this or any other University or Examination Board”.

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July 2014

ABSTRACT

Introduction: Traumatic dental injuries are considered a dental public health problem due to their high prevalence worldwide. Major complications can be associated with trauma, affecting the quality of life of patients and their parents/carers. Information retention has been reported to decrease following stressful situations. It is important to understand the information seeking behavior (ISB) of these families to help them understand and retain information provided regarding dental trauma.

Aims: To investigate the ways in which dental trauma patients and their parents, look for information, the reasons why, and the types of information they would like to receive. Also to draw comparisons between children and their parents regarding ISB.

Method: This was a mixed qualitative and quantitative prospective study included two phases. Phase one involved qualitative data collection from in-depth interviews conducted with trauma patients and their parents. These interviews were analysed using framework analysis and commonly occurring concepts identified. Phase II of the study involved distributing patient and parent questionnaires, based on the themes and subthemes identified from the interviews.

Results of phase I: One-to-one in-depth interviews were conducted with 10 patients and 11 parents. Patients' interviews identified 10 main themes while parents' interviews identified 8 main themes. Each one of these themes incorporated subthemes. The themes were used to develop patient and parent-based questionnaires, which were piloted with 13 patients prior to phase II.

Results of phase II: questionnaires were distributed to 68 patients and 70 parents. Initially, the majority of patients wanted to know if their tooth could be saved, possible outcomes and planned procedures to treat their teeth. Concerns during treatment were mainly about function and aesthetics. Patients preferred to receive this information verbally from their dentist.

Parents initial concerns were similar to the patients', and included the possible long-term outcome, severity of the trauma, possibility of maintaining the tooth and available treatment options. During treatment, the majority of parents were also worried about aesthetics and the possibility of the tooth losing vitality. In the long-term, parents were mostly concerned about available treatment options when their

children reached adulthood. Parents' preferred to receive written information in the form of summary letter or booklet.

Conclusion: It is important to understand that the information needs of patients and parents differ and to tailor information provision for each group accordingly.

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LIST OF ABBREVIATIONS

BDA: British Dental Association

BSPD: British Society of Paediatric Dentistry

CPD: Continues Professional Development

EDH: Eastman Dental Hospital

GCP: Good Clinical Practice

GDP: General Dental Practitioner

GMP: General Medical Practitioner

IADT: international Association of Dental Traumatology

ISB: Information Seeking Behaviour

NatCen: National Centre for Social Research

NHS: National Health Services

NRES: National Research Ethics Service

PI: Principle Investigator

TDIs: Traumatic Dental Injuries

TV: Television

Chapter One

Background

1 Background

1.1 Dental trauma

1.1.1 Prevalence

Traumatic dental injuries (TDI) in children and adolescents are considered a dental public health problem due to their high prevalence worldwide (Bijella *et al.*, 1990; Bastone *et al.*, 2000). The prevalence of dental trauma varies between countries, ranging from 4.1% to 58.6% for the permanent dentition (Table 1-1) and from 9.4% to 36% for the primary dentition, (Table 1-2) (Glendor, 2008). Luxation injuries are considered the most common type of TDI in the primary dentition, while crown fractures occur more commonly in the permanent dentition (Flores, 2002; Kramer *et al.*, 2003; Andreasen *et al.*, 2007). In the majority of TDIs, the central incisors are affected (Eyuboglu *et al.*, 2009) and comprise 73% of all injuries (Roberts and Longhurst, 1996).

1.1.2 Associated factors

Factors that may influence trauma include gender, age, history of previous trauma and medical history. Males experience trauma twice as often as females (Gabris *et al.*, 2001), however, this difference seems to be decreasing (Burden, 1995; Traebert *et al.*, 2003). Some studies have found that trauma peaks in younger children between 1 to 3 years of age, when children are learning to walk (Bijella *et al.*, 1990; Bastone *et al.*, 2000) and in older children between 8 and 11 years old due to accidents at home or at school whilst playing (Gabris *et al.*, 2001). An increased overjet and lack of lip competence may be predisposing factors (Dearing, 1984; Burden, 1995; Stokes *et al.*, 1995; Kania *et al.*, 1996). Only a small number of reports have included ethnicity or socio-economic status in their data collection, therefore, the exact relationship is unknown (Glendor, 2008). It has been reported that children with a previous history of dental trauma have a greater chance of repeated trauma. Ramos-Jorge and co-workers suggested that after two years follow-up, the incidence of trauma in children with a previous history of trauma is 11.9% compared with 2.7% in children with no history of trauma (Ramos-Jorge *et al.*, 2008). Children with certain medical conditions may be more likely to sustain TDIs; children with epilepsy, for instance, have an increased risk of experiencing dental trauma (54%) compared to 12.5% in healthy children (Percival *et al.*, 2009).

Table 1-1 Prevalence of traumatic dental injuries in the permanent dentition (Glendor, 2008)

Table 1-2 Prevalence of traumatic dental injuries in the primary dentition (Glendor, 2008)

1.1.3 Aetiology

The majority of TDIs in all age groups are associated with falls (Eyuboglu *et al.*, 2009). In the primary dentition, this is primarily due to the lack of coordination and experience in movement; and therefore, there is an increased incidence at ages 1-3 years when toddlers are learning how to stand, walk and run (Andreasen *et al.*, 2007). In a small number of children, non-accidental injuries may also need to be considered (Tate, 1971). In the permanent dentition, TDIs are frequently associated with falls (Traebert *et al.*, 2003) and sports (Johnson, 1975; Nysether, 1987; Petersson *et al.*, 1997; Rodd and Chesham, 1997). Other causes include cycling (Andreasen, 1970; Jarvinen, 1980), traffic injuries (Kulowski, 1956; Kulowski, 1960), fights and violence, and inappropriate use of teeth or biting hard items (Traebert *et al.*, 2003).

1.1.4 Classification

Many factors have been considered for TDI classification, include: aetiology, anatomy, pathology, therapeutic considerations (McBride, 1952, Ellis and Davey, 1970; Ingle and Beveridge, 1976; Garcia-Godoy, 1981; Johnson, 1981; Andreasen *et al.*, 2007) and degree of severity (Jarvinen, 1980; Holland *et al.*, 1988). TDIs have been classified clinically into: (i) Injuries to dental hard tissues and the pulp, (ii)

injuries to the periodontal tissues, (iii) injuries to the supporting bone, and (iv) injuries to gingiva and oral mucosa (Andreasen *et al.*, 2007).

Injuries to the dental hard tissues are sub-classified into: uncomplicated crown fractures; complicated crown fractures; root fractures, and crown-root fracture; while injuries to the periodontal tissues (luxation injuries) include: concussion, subluxation, lateral luxation, extrusion, intrusion and avulsion (Andreasen *et al.*, 2007) as shown in Figure 1-1. The prevalence of different types of TDIs in the primary dentition is shown in **Table 1-3** and for the permanent dentition in Table 1-4. Uncomplicated crown fracture including enamel only was the most common type of TDIs in primary dentition (Dutra *et al.*, 2010), while uncomplicated enamel-dentine crown fracture was most occurring type of trauma for permanent dentition (Rajab, 2013).

Figure 1-1 Types of traumatic dental injuries (Dental trauma guide, 2010)

Table 1-3 Prevalence of different types of trauma in the primary dentition (Dutra *et al.*, 2010).

Type of trauma/ age group	(Rajab, 2003)			(Roberts and Longhurst, 1996)
	7-9 years (%)	10-12 years (%)	13-15 years (%)	7-16 years (%)
Uncomplicated crown fracture (enamel).	16.3	21.2	14.6	55
Uncomplicated crown fracture (enamel- dentine).	44.0	43.8	43.8	16
Complicated crown fracture	24.1	27.9	37.5	5
Root fracture	N/A	0.7	2.1	1
Crown root fracture	0.7	1.1	1.0	N/A
Luxation injuries	7.8	2.8	1.0	19
Avulsion injuries	7.1	2.5	N/A	2

Table 1-4 Prevalence of different types of trauma in the permanent dentition

1.1.5 Treatment and expected outcomes

The treatment and the expected outcomes depend on several factors such as, the type of trauma, severity of trauma, type of dentition, maturity of roots, time elapsed since the trauma and the storage media in which the avulsed tooth was kept in. The main aim for treatment of the primary dentition is to reduce discomfort and damage to the permanent successor (Andreasen *et al.*, 2007). The aim of treating permanent teeth is to maintain vitality, space, aesthetics and prevent pathological changes (Andreasen *et al.*, 2007).

1.1.6 Sequelae of trauma

1.1.6.1 Primary dentition

Trauma to the primary dentition might lead to various outcomes to the primary teeth themselves, or their permanent successors. An injured primary tooth may undergo discolouration, pulp obliteration, pulpal necrosis with abscess or swelling, external or internal resorption, ankylosis and cystic formation (Borum and Andreasen, 1998).

Injury to the permanent successor occurs in 12-69% of cases following trauma to primary dentition and in 19-68% of cases of jaw fractures (Welbury *et al.*, 2005). Certain types of trauma to the primary dentition have a more significant impact on the development of the permanent successor including intrusion, avulsion and dento-alveolar trauma (Andreasen *et al.*, 2007). Other factors that may influence damage to the permanent successor are: the age of child and the length of the root at the time of trauma. More damage occurs with younger children where the roots of the primary

teeth are long and in close relationship with the permanent successor (Andreasen *et al.*, 1971). Damage to the successor may include enamel hypomineralisation or hypoplasia, crown or root dilacerations, arrest of root formation, odontoma-like malformation, root duplication or disturbance of eruption (Andreasen *et al.*, 1971).

1.1.6.2 Permanent dentition

Trauma to the permanent dentition may result in: loss of vitality, internal or external resorption, ankylosis, pulp obliteration or loss of the permanent tooth (Andreasen *et al.*, 2007). The impact of these outcomes is explained in section 1.1.7 and 1.1.8.

1.1.7 Cost and length of treatment

TDIs are considered an important issue for parents, patients and clinicians, as they can be associated with lifelong treatment (Andreasen *et al.*, 2007) and high cost (Wong and Kolokotsa, 2004). They may require intervention from secondary and tertiary health services using materials and methods which may not be readily available in primary care services (DiAngelis *et al.*, 2012). Wong and co-workers investigated the total cost, number of visits, and time required for treating children and adolescents with dental injuries in the United Kingdom. They included both direct (dental visits) and indirect costs (estimated daily income for parents missing work) of treatment to indicate the true “social cost”. The average cost of treating a patient with an injured incisor was therefore estimated to be £856, with 39% in indirect cost. The average number of visits was 8 (ranging from 3-27) and was directly influenced by the severity of the trauma and success of the outcome. The average time required for treatment was 21 months with 25% of patients requiring more than 36 months to finish their treatment (Wong and Kolokotsa, 2004).

1.1.8 Impact on Quality of Life

The appearance of the anterior teeth can have a psychological and social influence on a child's life (Helm *et al.*, 1985) and any injury to these teeth can cause significant emotional and social issues (Cortes *et al.*, 2002). Aesthetic and functional alterations associated with traumatic injuries such as colour change, tooth mobility and pain, may impact children's quality of life (Strassler, 1995, Ramos-Jorge *et al.*, 2007). Children, regardless their gender or social background, seems to be aware of their dental aesthetic (Burden and Pine, 1995) and the appearance of their teeth was considered the most important aesthetic characteristic (Prokhorov *et al.*, 1993).

Cortes and colleagues investigated the impact of untreated traumatised anterior teeth on daily performance. They found that dental injuries impacted on eating and enjoying food, cleaning teeth, smiling, laughing and showing teeth without embarrassment, maintaining their usual emotional state and enjoying socialisation (Cortes *et al.*, 2002).

Another study reported the quality of life of children with treated and untreated dental injuries compared with children with no history of trauma. They found that children with untreated teeth following trauma experienced difficulties in chewing, avoidance of smiling and socialisation; while those with treated teeth had problems only with chewing when compared with healthy children (Fakhruddin *et al.*, 2008).

It is also important to consider the impact of the dental aesthetic on children's well-being; it has been reported that children with untreated traumatised teeth may suffer negative social judgment from their peers (Rodd *et al.*, 2010). Shaw and co-workers studied the appearance-related bullying amongst school children; comments related to their teeth were more significantly upsetting when compared with other features (Shaw *et al.*, 1980).

TDIs can significantly affect children and their parent's lives, and there is a large amount of information to be provided to patients and their parents to help them understand the condition and the consequences (personal and financial). There are no studies available looking at what information patients and their parents would like to receive about TDI; how these patients and their parents want dental health professionals to provide them with this information, and when they prefer to receive the information.

1.1.9 Prevention

Several studies have suggested that the use of a mouthguard can reduce TDIs associated with sports (Nowjack-Raymer and Gift, 1996). One study reported that the risk of orofacial trauma is 1.6 to 1.9 times higher risk, when a mouthguard was not worn (Knapik *et al.*, 2007). However, a systematic review investigating the effectiveness of mouthguards in preventing sport injuries found that the available literature mainly focused on advertising mouthguards and only few epidemiological studies looked at the actual effectiveness of mouthguards, and they did not agree with each other. They concluded that the key messages should be prevention education on how to prevent trauma in the first place, and the immediate

management following trauma (Sigurdsson, 2013). Education should target all children, adolescents and those who might be around them at the time of trauma, such as parents and school teachers. Patient education could also be done by the dentist during routine dental appointments. Dentists can explain the possible risk factors that could lead to traumatic injuries; such as children with increased overjets. Campaigns aiming to raise public awareness regarding other health issues have been widely used, including television, newspaper, information leaflets, posters, lectures and web-based information. They could be a useful tool to educate the public on how to prevent trauma, and what to do if a traumatic injury occurred. The International Association of Dental Traumatology sponsored a poster (Figure 1-2) that has been suggested could be a useful education tool if widely displayed (Sigurdsson, 2013).

Figure 1-2 IADT educatory poster for immediate management following trauma (IADT, 2011)

1.2 Patient education

1.2.1 Patients and information

In situations such as TDIs, information needs to be given to patients and their parents throughout the course of their treatment. Modern healthcare has become more patient-centred in recent years, by involving the patient in decision-making and treatment planning (Darzi, 2008) rather than the doctors making the decisions on the behalf of the patients (Buja *et al.*, 2011). When including patients in health related decisions, education is an important tool to provide them with the detailed information they need about their healthcare, rights and obligations (Estey *et al.*, 1994; Buja *et al.*, 2011). This process should not be limited to the first appointment, but it should be an on-going process that continues throughout treatment (Luker *et al.*, 1996). The need for information changes over the treatment period; therefore, it is important to structure and prioritise the information given to the patient to help them retain and understand it (Luker *et al.*, 1996).

1.2.2 Information retention

When children are discharged from the hospital after finishing their treatment, parents are provided with information to continue care at home (Johnson *et al.*, 2003). Providing patients with information is an important step of patient care; however, it has been reported that the amount of information that can be recalled by patients is minimal (Hons, 2000; Kessels, 2003). Patients tend to forget 40-80% of the information given by their healthcare practitioners, and the more information given to patients, the less they can remember correctly (McGuire, 1996). Andreassen and colleagues reported that almost half of the information the patient can recall is incorrect (Andreassen *et al.*, 1979). Factors such as memory, understanding of information and patient satisfaction might influence information adherence (Ley, 1988). Three possible explanations suggesting why patients tend to forget the information: factors related to clinicians, factors related to the patient and mode of information (Ley, 1979).

1.2.2.1 Clinician-related factors

Clinician-related factors include doctor-patient communication. This can be improved by proper history recording, treating the patient with respect and empathy, and

understanding the impact on their life (Robinson, 2002). In addition, good listening and avoiding complicated medical terminologies are important skills needed for better communication (Whitehouse, 1991). The use of simpler language, categorization of the information, repetition, and giving specific advice rather than general information are also suggested to help patients retain information (Ley, 1979).

1.2.2.2 Patient-related factors

Patient-related factors include: age, anxiety and distress and, perceived importance of the information (Kessels, 2003).

- Age: storing and retaining information may be reduced with age (Glisky *et al.*, 2001), with a reduction in the amount of information remembered correctly by older people reported (Morrow *et al.*, 1999). Information seems to fade with time across all age groups (Rice and Okun, 1994). Explanations for this reduction include: age-related cognitive impairments (Kessels, 2003), lack of ability to structure information for easier recall (McGuire, 1996) and if the information contradicts a previous knowledge or belief (Ley, 1988). Therefore, it has been advised to give the patient a short period of time to make a decision after providing them with the information (McGuire, 1996).
- Anxiety and distress: Poorer retention of information might be associated with anxiety or stress following information given pre-operatively (Hons, 2000) or in a life threatening situation (Cimprich, 1992). One study reported lower information recall if the healthcare professional used worrying expression or words (Shapiro *et al.*, 1992). This would limit the patients' attention to that specific impression and increase their anxiety and therefore, their attention for the remaining information (Ley, 1979). Moderate anxiety seems to be the best state for remembering information, whereas patients with very high or low anxiety tend to remember less information (Ley, 1979). The amount of information that can be remembered by patients is linked to their medical knowledge and level of anxiety (Ley, 1979). Anxiety and wanting to hear good news might also prevent the patient from asking their health professional questions related to their condition, and also might reduce their ability to recall given information (Wolf, 2004).
- Perceived importance of information: patients tend to remember and correctly recall the information they think is more important (Ley, 1979; Kessels, 2003), such as diagnostic statements rather than those related to the treatment

(Kessels, 2003). Therefore, proper structuring and clear emphasizing of importance should be used when giving the patient any medical advice (Kessels, 2003).

The form in which information is given is also reported to be a relevant factor in information adherence. Verbal advice is a widely used method for giving patients information, however, it is not very effective for retaining information (Thomson *et al.*, 2001). On the other hand, written information has been shown to be successful, and better retained by patients (Blinder *et al.*, 2001). Videos are also useful and aid in better retention and understanding of information, especially for those with a lower educational level (Delp and Jones, 1996). Using photographs with verbal instruction showed that 80% of the information was remembered correctly compared with 14% with verbal instructions alone (Houts *et al.*, 2001). However, some researchers have argued that the use of multimedia information has only a short-term effect, when compared with written information (Barkhordar *et al.*, 2000) and children prefer to listen to a doctor giving them the instructions rather than watching a video (Bakker *et al.*, 1999). A combination of verbal and written or visual information is probably the better option for information retention (Thomson *et al.*, 2001).

1.2.3 Types of information

The change in health policy to shorter appointments and a decreased average length of in-patient stay, has resulted in an increased need for patients and/or their carers to take on the responsibilities to continue the care they have been receiving at the hospital by themselves (Leino-Kilpi *et al.*, 1993). Therefore, there is a growing demand for information provision to help the patient undertake effective “after care” (Johnson *at al.*, 2003). As a response to this demand, health professionals use different formats for delivering information such as verbal, written, video or audio tapes, phone calls, emails and websites and the patients can choose the best format to meet their needs (Linke, 1996).

1.2.3.1 Verbal information

Providing the patient with the information in the first appointment should be based on their need. It is important to consider that information retention in these stressful situations is poor therefore, it is preferable to give the patient the appropriate priority information in the first appointment and then to give specific information at follow up appointments (Luker *et al.*, 1996).

Health professionals play an important role in reassuring and promoting a sense of trust when giving the patient health related information (Wolf, 2004). Effective communication between the health professional and patient via verbal and non-verbal communication plays an important role for optimal health outcomes (Rutten *et al.*, 2005). The attitude and the manner of the health practitioner might act as a barrier to receiving information for some patients (Wolf, 2004). Therefore, understanding the patients' need, the right time to provide information and in what context become important factors for better quality of health care (Rutten *et al.*, 2005).

1.2.3.2 Written information

Written materials are widely used in healthcare. It is essential to support and confirm the verbal information provided and these may then help in decision-making (Wolf, 2004). Providing patients with written information, especially after stressful situations, is considered an important factor on the outcomes (Leino-Kilip *et al.*, 1993). Written information regarding "after care" has been suggested to reduce the demand and improper use of the health services, enhance satisfaction about a service, raise the confidence of patients to manage their own care with proper adherence to the instructions, and reduction of the recovery period with lower frequency of readmission (Johnson *et al.*, 2003).

Written information can be provided in the form of: books, booklets, mind maps, acronyms, leaflets or brochures (Johnson *et al.*, 2003; Wolf, 2004; Thickett and Newton, 2006). Thickett and Newton assessed the information retention related to three forms of written information; the mind map, acronyms and leaflets. In the short term, information retention was better in patients who were given the acronym and mind maps; however, in the long term there was little difference between the three forms (Thickett and Newton, 2006).

The disadvantage of this form of information provision is that it depends on the reading and comprehension levels of the population, which can vary greatly amongst individuals (Estey *et al.*, 1994). Estey and co-workers assessed patients' level of understanding of medical leaflets. They designed two leaflets with the same content but with different reading levels; one for grade five (age 10-11) and one for grade nine (age 14-15 years). They found that the level of education varied among patients and the understanding of medical information might be affected by the environment and anxiety; therefore they recommended all information leaflets should be written at grade five level (Estey *et al.*, 1994). It is important to consider different learning levels

of the patients; this can be provided by asking the patients to repeat the information given to them, or by the use of plain language, such as the Plain English Campaign (2009) which aims to provide the public with clear and concise information. These campaigns ensure the use of everyday English, proper punctuation and grammar, shorter sentences, use of headings in addition to the proper type face and size when providing the patient any written information (Colledge *et al.*, 2008).

Another disadvantage of written information is that it may not be appropriate for patients with learning difficulties or visual disabilities (Kessels, 2003).

Al-Asfor and Andersson assessed information retention regarding tooth avulsion after distribution of an information leaflet. They assessed the knowledge of parents of 150 children in primary school, and then reassessed their knowledge one week following distribution of the information leaflet. They found that the level of knowledge improved as a result of reading the leaflet. However, long-term retention of the gained knowledge was not assessed (Al-Asfor and Andersson, 2008).

Another study compared the orthodontic information retention of two groups; where one group was provided with an information leaflet and the other with a Power point presentation including the same information with pictures. The computer-based visual information group showed higher information retention in the short and long-term (Patel *et al.*, 2008).

1.2.3.3 Audio-visual

It has been suggested that the widespread use of audio-visual aids can be beneficial in oral health promotion and might lead to greater awareness among the public (Alsada *et al.*, 2005). Audio-visual material can provide information to patients in a stress-free environment which patients can access at their convenience (Alsada *et al.*, 2005; Ryan *et al.*, 2008).

One study designed a video for promoting infant oral health to expectant young mothers with low levels of dental knowledge. The knowledge level was assessed before and after watching the video using a questionnaire. Before watching the video, 41% of the questions were answered incorrectly or by "I do not know" and after watching the video, 91% of the questions were answered correctly. It has been suggested that showing these videos in the presence of health professionals may be beneficial, so that patients can stop when required, and professionals can answer

questions raised by the patients (Alsada *et al*, 2005). The disadvantage of this method is the cost of production and the patient needs to have the necessary equipment such as the computers to be able to play the video DVD (Greenwood, 2002).

1.2.3.4 Media

Media such as television, radio and newspapers are considered an important source of health information, with 40% of adults obtaining health related information from these sources (Kaiser Health Poll Report Survey, 2005). Researchers reported that the use of mass-media appears to be helpful in raising the public awareness, and is one of the important factors for prevention of dental diseases (Schou, 1987). One survey undertaken in Finland to investigate the sources of dental health information, found that the most common sources of information used were television and radio. However, this study was conducted over 30 years ago (Murtomaa *et al*, 1977).

Schou evaluated the effect of a national dental health campaign via television commercials for children and a pamphlet inserted in a women's magazine. Children included in the study were able to remember the commercial regardless of their age, living area, socio-economic status and the level of their mother's education in the short-term and the longer-term (2 months) periods. This study also showed that the television commercial and leaflet were mostly seen by lower socio-economic class women (Schou, 1978). However, another health campaign regarding periodontal health found better responses in younger age groups with higher education and income (Bakdash *et al*, 1983). It had been suggested that using media as a source of information would increase the interest rather than change the behaviour of individuals (Zarkowski and Getzfrid, 1979).

The disadvantage of using the television as a source of information is that health related information on the television can be distorted (Schwitzer, 2004). Frazer and co-workers concluded in their study that the everyday oral health information provided by the mass-media are 'misleading' and 'conflicting' (Frazer *et al*, 1974).

1.2.3.5 World Wide Web

The internet has become a popular source of information. The number of individuals in the United Kingdom using the internet is increasing; less than 60% of individuals had access to the internet in 2006, whereas by 2010, 73% of households have

access to the internet, and 31% of individuals had internet phone access (The National Office of Statistics, 2010). In the United States, more than 70% of the population have internet access and 61% of adults use the internet to look for health related information (Fox, 2011). In Sweden, however, only 16% of patients used the internet as a source of health related information (Carlsson, 2000).

Internet use as a source of health related information, has been associated with different factors including: age, gender, income, internet experience and level of education. Younger age groups (aged 18-24) use the internet more frequently than older groups (Westerman *et al.*, 2008). Males tend to use the internet more frequently than females, however, females use it more frequently with regards to health (Rice, 2006). Younger age groups are less likely to look for health related information, compared with older age groups, perhaps due to the increased prevalence of illnesses in older age. Individuals who use the internet frequently tend to use it more as a source for health related information (Rice, 2006). Similarly, highly educated individuals are more likely to search for a health related matters using the internet (Carlsson, 2000).

Five reasons has been identified to explain why people seek information from the internet; these include: (i) newly diagnosed, (ii) ongoing condition, (iii) newly prescribed medicine, (iv) no time for consultation, (v) and unable to find an appointment for consultation (Rice, 2006). Most individuals (93%) were able to find the answers to their questions, with the majority used a general searching engine rather than looking in medical websites directly (Fox and Rainie, 2002; Rice, 2006).

The disadvantage of this method is the reliability of the information. Most online health information seekers use common sense to judge the quality and reliability of the information. The main reasons for rejecting information include if the website used unprofessional imaging or contained high commercial input, or if it is more concerned about selling products rather than information provision (Fox and Rainie, 2002, Rice, 2006). Patel and Cobourne assessed the information available regarding orthodontic extractions on the internet using the commonly used searching engines. They found that the quality of the available information varied among websites and none of these websites reached the 90% gold standards set (Patel and Cobourne, 2011).

Al-Sane investigated the most preferred source of information regarding immediate management of avulsed teeth. They found that the internet, health professionals and the television were the most preferable methods; the internet was preferred by younger adults and highly educated people while older adults preferred television as a source of information (Al-Sane *et al.*, 2011).

McIntyre and co-workers investigated the information retention of primary school teachers. They found that giving an information leaflet regarding the first aid after trauma together with a lecture at the same time, significantly improved the information retention after 3 months, when compared with those who received the information leaflet alone (McIntyre *et al.*, 2008).

Whilst our understanding of how different types of information are retained has been investigated, we also need to explore the ways in which patients seek information about healthcare.

1.3 Information seeking behaviour

The last decade has witnessed a significant increase in patients seeking health information. The reasons behind this increase is probably due to the advent of the "information age" and more readily accessible information via the internet. Also, greater patient involvement in healthcare decisions is increasingly becoming a part of health policy and good practice (Shortliffe and Cimino, 2006; Lambert and Loiselle, 2007; Abrahamson *et al.*, 2008).

Information seeking behaviour (ISB) is defined as "the ways in which individuals go about obtaining information about their health promotion activities, risks to one's health, and illnesses" (Lambert and Loiselle, 2007). It is frequently investigated in relation to life threatening situations, behaviour change and patient involvement in decision making (Lambert and Loiselle, 2007). Studies showed that looking for information may enhance how readily an individual copes with medical situations (Van der Molen, 1999; Davison *et al.*, 2002; Henman *et al.*, 2002; Clark, 2005; Flattery *et al.*, 2005). Similarly, finding relevant information has been shown to be helpful in decision making by providing individuals with the possible treatment options, how to weigh them up, decide the best option for their condition and reduce the uncertainty about the alternatives (Huber and Cruz, 2000; Brown *et al.*, 2002; Budden *et al.*, 2003; Johnson, 2003). The literature suggests that acquiring adequate information might lead to positive health behaviour, however, this is not a guaranteed association (Loiselle *et al.*, 2001; Shi *et al.*, 2004; Meischke *et al.*, 2005; Szwajcer *et al.*, 2005).

1.3.1 Information seeking behaviour in children

There is relatively little information regarding health information seeking behaviour in young people, and most of the available literature focuses on adolescents. Studies have shown that parents and peers are considered a key source of information for younger children (Dickonson, 1978; Thornburg, 1981; Gould and Mazzeo, 1982; Van den Berg and Parry, 1983; Chambers *et al.*, 1997; Klein *et al.*, 1999; Ackard and Neumark-Sztainer, 2001). It has also been suggested that there is a difference in sources of information between genders, where females tend to ask their mothers embarrassing queries and males tend to ask their peers (Thornburg, 1981). For older adolescents, doctors and nurses are often cited as their source of information (Ackard and Neumark-Sztainer, 2001) and the media is also reported to be a source

of information for this age group, especially regarding topics such as smoking and drug use (Sheppard, 1980; Mirzaee, 1991; Kurtz *et al.*, 2001). Internet usage is increasing rapidly as a source of information for adolescents (Gould and Mazzeo, 1982; Brodie *et al.*, 2000; Borzekowski and Rickert, 2001; Rideout, 2002; Hansen *et al.*, 2003; Hanauer *et al.*, 2004) and a survey of internet use found that 75% of 15 to 24 year old participants sought health information in this way (Rideout, 2002).

1.3.2 Information need in children regarding dentistry

Adekoya-Sofowora and co-workers investigated the dental information needs of adolescents aged 14-16 years. They found that children were keen to know and understand certain matters regarding their teeth, and wanted to discuss treatment plans and how to keep their teeth throughout their life. Others wanted explanations about different aspects of dental treatment including the best toothpaste to be used, use of mouth wash and what to do in case of dental injuries. It was also found in this study that the children's information needs were not always met and that the dentists need to involve them more in dental care. (Adekoya-Sofowora *et al.*, 1996)

Another study assessed the information seeking behaviour of adolescent orthodontic patients. They found that the preferred method of seeking information was verbal information by asking their orthodontist, parents or GDP followed by written information and audio-visual information. The majority of patients did not use the internet as a source for information due to the issues associated with the reliability of information (Stephens *et al.*, 2013).

1.3.3 Information provision in trauma

Despite the fact that dental trauma is common, knowledge of trauma in the general public remains low (Sae-Lim *et al.*, 1999; Al-Jundi, 2006; Glendor, 2009; Hegde *et al.*, 2010). It is important for parents, carers/guardians or teachers to be educated about trauma as most accidents occur at home (Rajab, 2003), or school (Dutra *et al.*, 2010). Several studies have surveyed parental knowledge and their awareness of the appropriate management in different situations, including avulsion (Raphael and Gregory, 1990; Hamilton *et al.*, 1997; Sae-Lim *et al.*, 1999; Al-Jundi, 2006; Glendor, 2009) and fractures of teeth (Sae-Lim *et al.*, 1999; Al-Jundi, 2006). Maternal knowledge regarding the appropriate immediate management of fractured teeth was correct for 35-36% of cases but for avulsed teeth was correct in only 1-6% of cases (Sae-Lim *et al.*, 1999; Al-Jundi, 2006).

Knowledge about trauma should include prevention where possible, but also how to deal with emergencies should they occur, in order to increase the likelihood of successful outcomes. Parents also need to be familiar with the types of trauma their child might experience and how to share in decision making and treatment planning with the dentist should it occur (Hegde *et al.*, 2010). The conclusion of the majority of the available studies is that there is a need for educational programmes aimed to educate parents on the management of trauma (Raphael and Gregory, 1990; Hamilton *et al.*, 1997; Sae-Lim *et al.*, 1999; Al-Jame *et al.*, 2007; Hegde *et al.*, 2010).

Little research has been conducted on the ways in which child patients and their parents, carers or guardians find out information about dental trauma, the reasons they seek information and the type of information they would like to receive. The literature suggests that what healthcare providers think patients want to know, and what patients actually want to know may be quite different. Healthcare providers often assume patients want formal, objective information, but there is evidence to suggest that patients prefer informal, subjective information (Miyashiro, 1991; Brashers *et al.*, 2004). One study reported that giving the patient a leaflet regarding the first aid for an avulsed tooth can be a valuable tool to provide the parents with basic information regarding this type of injury (Andreasen *et al.*, 2007; Al-Asfour and Andersson, 2008). However, there are no studies which have investigated the information seeking behaviour in child dental trauma patients and their parents, carers or guardians.

To determine the information seeking behaviour of the children and their parents, carers or guardian, a qualitative approach would be ideal to discover, explore and obtain a deeper understanding of their opinions and information needs (Pope and Mays, 2006).

1.4 Qualitative studies

Qualitative studies are designed to discover, interpret or obtain deeper understanding of a specific area of human belief, attitude or behaviour (e.g. experiences and perspective). They are considered ideal for studies where opinions may be subjective (Pope and Mays, 2006). Qualitative methods can be used alone or as part of research at various stages: for example, they can be used at the beginning of a study to explore a hypothesis or under-researched area which is then tested using quantitative research or alternatively the techniques may be used to evaluate opinions about a certain course of action (Blinkhorn *et al.*, 1989, Blinkhorn, 2000, Chestnutt and Robson, 2001). The most commonly used methods in qualitative research in health care are focus groups, interviews, and diaries or documents (Stewart *et al.*, 2008). Qualitative semi-structured interviews are commonly used in health care research, (Stewart *et al.*, 2008), although this is mainly in adults.

It has been suggested that the lack of qualitative research in younger children may be due to ethical issues such as vulnerability, consent and confidentiality (Alderson *et al.*, 2004, Helseth and Slettebo, 2004); and lack of good cognitive, linguistic and social skills to provide adult interviewers with reliable and valid interview data (Docherty and Sandelowski, 1999, Christensen and James, 2000, Fraser, 2004). However, it has been shown that children can give rich, deep and trustworthy information (Christensen and James, 2008, Instone, 2002). The semi-structured interview format is the most suitable method for children, as it provides them with some guidance on what to talk about (Gill *et al.*, 2008).

There are two main approaches for analysing qualitative data: deductive and inductive approaches. The deductive approach involves a predetermined and pre-formed structure for data analysis. This approach is quick and easy to perform, however, it is often considered inflexible and there is the possibility of bias as the framework is imposed by the researcher prior to the interviews. The inductive approach, on the other hand, involves data analysis without a pre-formed framework and uses the data to develop a structure for the analysis. It is a comprehensive approach and requires considerable time (Burnard *et al.*, 2008). However it is the most commonly used analytical approach (Gerrish and Lacey, 2006) and is ideal for studies with little or no pre-existing available data. There are a variety of analytical methods used in the inductive approach and the most commonly used method is

thematic content analysis (Pope et al., 2000, Seale, 2004). Thematic analysis includes analysing transcripts, identifying themes from the collected data and then gathering examples of those themes from the transcript text (Burnard *et al.*, 2008).

Chapter Two

Aims and objectives

2 Aims and Objectives

2.1 The aims

The aims of this study are:

- To investigate the ways in which children and adolescents who have suffered from dental trauma, and their parents, carers or guardians, find out information about dental trauma, the reasons they have for finding out this information, and the type of information they would prefer to receive.
- To assess if there are any differences between the information seeking behaviour of children and their parents, carers or guardians.

2.2 Objectives

- To collect qualitative data acquired from one-to-one in-depth interviews with patients and parents, guardian or carers regarding their information seeking behaviour towards traumatic dental injuries.
- To use framework analysis to extract the main themes from the in-depth interviews, and use them to develop questionnaires for patients and parents.
- To distribute the questionnaire to a cohort of trauma patients and their parents to investigate their information seeking behaviour toward trauma.
- To develop information in the most preferred media for information provision and pilot it to assess its usefulness.

Chapter Three

Subjects and Methods

3 Subjects and Methods

3.1 Study design

This research was a prospective cross-sectional study, with mixed qualitative and quantitative methods. It was divided into two main phases.

3.1.1 Ethical approval

Ethical approval was obtained on the 15/05/2012 from the National Research and Ethics Service Committee (North East - Newcastle & North Tyneside 1), REC reference number (12/NE/0194) (Appendix 1). The research student (NB) attended a Good clinical practice (GCP) course as requested by the ethical committee prior to taking consent from participants.

3.1.2 Phase I

This was the qualitative part of the study and involved one-to-one interviews with patients and their parents to understand what information they wanted to know, and to investigate their information seeking behaviour regarding traumatic dental injuries. These interviews included questions regarding information needs at different stages of treatment, different sources used to look for information regarding trauma, and methods for raising the public awareness regarding dental trauma. In-depth interviewing allowed areas of interest to be explored from the patient and parent's perspectives with breadth and depth. Analysis of these interviews allowed development of themes and subthemes regarding their information seeking behaviour and allowed questionnaires to be developed in phase 2.

3.1.3 Phase II

The main themes and subthemes obtained from analysis of the interviews were used to develop patient and parent-centred questionnaires. The questionnaires provided data from a large cohort of patients and parents, and this was analysed to assess the sources of information used, reasons for seeking the information and the types of information required. In addition, it was possible to assess if there are any differences between children and their parents, carers or guardians and to develop information depending on the preferred medium.

3.2 Phase 1 (In-depth interviews)

3.2.1 Development of topic guide

Topic guides were designed separately for patients (Appendix 2) and parents (Appendix 3) for the areas to be covered during the interviews. They were designed by the research team based on the study objectives, the available literature and clinical experience. The topic guide included broad questions for semi-structured interviews; to ensure uniformity and consistency during data collection but also allowing flexibility to allow discussion of individual aspects relevant for each individual participant. A different topic guide was formulated for patients and their parents. The differences included phrasing of the questions and some of the introductory questions for the patients were not relevant for the parents.

3.2.2 Practicing interviews

Interview training was provided for the primary investigator (NB) by attending an in-depth interviewing course at the National Centre for Social Research in London, United Kingdom. Both the primary and secondary supervisors, who are experienced in interviewing techniques, provided further training. Practice interviews were undertaken with 5 colleagues, 3 acting as patients and 2 as parents. Practice interviews were recorded, so that the supervisors were able to provide feedback immediately after each interview. Particular attention was paid to clear phrasing of the questions, asking open-ended questions, and avoiding leading questions to probe the areas of interest. Modification to the topic guide was made accordingly.

After the first two formal interviews, the transcripts were reviewed by the supervisors and it was noted that some areas were not probed in depth, especially for the patient interviews. Therefore, further practice training was provided to improve probing skills and clarity of the questions. These interviews were followed by discussions to improve phrasing of the questions and how to probe and explore areas of interest. The transcripts of subsequent interviews were studied and it was felt by the research team that the interviews were producing sufficient data.

3.2.3 Participants

Participants were recruited from the Paediatric Dentistry Department, Eastman Dental Hospital, University College London Hospital (UCLH) Foundation Trust.

3.2.3.1 Sampling strategies and sample size

Selecting the appropriate sample for a research is a key point to be considered. In social research, two main types of sampling exist; Probability and non-probability samples. Probability sampling mainly used in quantitative type of research as it is considered vigorous approach such as stratified random sampling. Non-probability sampling on the other hand is suitable for studying complex issues associated with human behaviour or phenomena in qualitative studies. This approach helps selecting the sample which would provide rich information regarding area of interest, i.e. provides depth of information (Ritchie and Lewis, 2003). Purposive sampling is considered one of the most commonly used sampling strategies in qualitative research and was used in this research. In the strategy, participants are selected because they have a certain feature that the research team wants to explore in depth (Ritchie and Lewis, 2003).

Sample size selection was important step to be considered. Following consultation with a statistician, it was concluded that sample size calculation is not possible for this type of research based on participants' opinion. Based on previous researches, the sample size was estimated to be 10-15 patients and parents. In qualitative research, sample size tend to be small due to the following reasons: (i) a point of saturation will be reached during data collection where new themes stops arising, (ii) qualitative researches are not aimed to find prevalence, incidence or to support statistically significant findings, (iii) this type of research is intense, rich and most importantly time consuming and managing larger sample size may be difficult (Ritchie and Lewis,2003).

3.2.3.2 Inclusion criteria - patients

- Patient able to give assent and parents willing to give consent.
- Patients who had suffered any type of dental trauma and their parents, carers or guardian.
- Patients over 10 years old to ensure they had sufficiently well-developed linguistic and communication skills to allow an interview to be undertaken.
- Patients able to speak English sufficiently well to undertake an interview.

3.2.3.3 Inclusion criteria - parents

- Parents of all the patients who fit the inclusion criteria
- Parents able to give assent and parents willing to give consent.
- Parents able to speak English sufficiently well to undertake an interview.

All patients identified from the daily clinic list who fulfilled the inclusion criteria together with their parents, were invited to participate during routine dental appointments at any stage of treatment following their trauma. All interviews were undertaken between August 2012 and February 2013. A verbal explanation of the study objectives was provided for all potential participants and their parents, carers or guardians and written information leaflets were also provided (Appendix 4 and Appendix 5). Written consent from the parents and assent from the patients were then undertaken if they agreed to participate (Appendix 6, Appendix 7 and Appendix 8). Based on previous studies of this type, it was estimated that 10-20 patients (and the same number of parents) would be required until no new themes arose (Stephens *et al.*, 2013).

3.2.4 Interviews

Formal interviews were conducted with patients and their parents, and interviews stopped when there were no new themes arising “theoretical saturation”. One-to-one interviews were conducted separately for patients and their parents, away from the main clinical area. Verbal consent to record the conversation was taken prior to the each interview and an explanation regarding the need for recording and confidentiality of information was provided. The topic guide was used to outline the interview questions; and further explanation of issues was applied whenever new concepts or ideas were introduced by the interviewee. Those concepts were then added as new themes to the topic guide and were discussed in the subsequent interviews. Interviews were recorded using a Sony® digital recorder, coded and sent to be transcribed into a Microsoft Word® document by a transcription company who had signed a confidentiality agreement. Each interview recording was deleted after transcription but all transcripts were saved on two separate password-protected computers in the department in accordance with MRC (Medical Research Council) guidelines, which comply with the Data Protection Act (1998).

In each interview, the patient or parent was asked about using information leaflets. In order to make the question clearer, a sample information leaflet about fixed

orthodontic appliances (Appendix 9) was used as a guide, and interviewees were asked what they liked and disliked about the leaflet.

3.2.5 Analysis of the interviews

Different approaches have been used for analysing qualitative research and the most commonly used are ground theory and framework analysis. Framework Analysis, or thematic analysis, is considered more recent approach which was developed to provide outcomes or recommendations, often within a short timescale. Analysing data in this approach has 5 key stages which can be undertaken in a linear manner where all data to be collected before analysis begins, or analysis can occur while data are collected (Lacey and Luff, 2007; Ritchie and Lewis,2003).

The key stages of Framework Analysis are:

1. Familiarisation
2. Identifying a thematic framework
3. Indexing
4. Charting
5. Mapping and Interpretation

Familiarisation: this stage include reading the whole or part of the transcription several times.

Identifying a thematic framework: this step includes initial theme identification and initial coding of the framework which is developed both from issues already known and from emerging issues obtained from the familiarisation stage. This framework usually refined during subsequent stages.

Indexing: this stage includes applying the identified framework to the data. This could be done using different approaches like numbers, colours or textural coding to identify specific pieces of data which correspond to different themes.

Charting: this step involving arranging the data in the frame work to make them easy to track. This could be using tables, charts or diagrams (Lacey and Luff, 2007; Ritchie and Lewis,2003).

For this research, framework analysis was used because it is a widely used qualitative research technique which analyses the context and content of data (Hsieh

and Shannon, 2005). Initial Analysis of the semi-structured in-depth interviews started midway through the interview data collection. This approach called “constant comparison” mainly used in the ground theory (Glaser and Strauss, 1967 cited in Cerniglia, 2008), where the transcripts analysis established as the data collection is proceeding which helps in guiding future interviews. In this study, this initial analysis was carried out to increase the validity of the interviews by identifying any new themes or topics.

After finishing all the interviews, all transcripts were analysed using a thematic approach key stages, which patient and parent interviews considered differently. The transcripts were thoroughly reviewed several times to identify commonly occurring concepts, and main themes were identified using different colours in Microsoft Word. This process was also repeated for each main theme, to identify the subthemes involved and those subthemes were then added to the original theme framework (Table 4-2 and Table 4-5). This process was done by the research student and one of the supervisor separately for the first couple interviews to insure reliability of the framework, and the final framework was agreed and reviewed by both supervisors at the end of the analysis. The framework was then transferred into Microsoft Excel where each theme was presented by a separate sheet. The columns in each sheet represented the subthemes while the rows represented individual patients. Direct quotes were then inserted, where relevant, into the framework with indexing for easy location of data (Appendix 10 and Appendix 11).

3.3 Phase 2 (development and distribution of the questionnaire)

Following analysis of the interviews, separate patient (Appendix 12) and parent (Appendix 13) questionnaires were developed using the themes and subthemes from the framework analysis. Williams (2003) designed a scheme for developing questionnaires, which was used in the study.

- Define the research question and study population
- Decide how the questionnaire will be administered
- Formulate the questions
- Formulate the responses
- Design of the questionnaire
- Piloting the questionnaire

Each of these factors is discussed in detail below.

3.3.1 Define the research question and study population

The aim of this part of study was to use the information obtained from the interviews to develop and distribute a questionnaire to a larger cohort of patients/ parents. The inclusion criteria for this phase of the study were the same as for phase one of the study. The aim was to recruit patients and their parents to complete the questionnaire and therefore, be able to compare their results. All patients who fulfilled the inclusion criteria were invited to participate during a routine dental appointment at any stage of treatment following their trauma.

3.3.2 Decide how the questionnaire will be administered

The questionnaires were distributed in person by the research student (NB) to trauma patients and their parents, guardians or carers. A verbal explanation of the study objectives was provided as well as written information leaflets (Appendix 14 and Appendix 15). Written consent from the parents and assent from the patient were then undertaken (Appendix 16, Appendix 17 and Appendix 18) if they agreed to participate. Patients and parents were then asked to complete the questionnaire on the same day or to bring it back at their next appointment.

3.3.3 Formulate the questions and responses and designing the questionnaires

The questions and associated responses for both patient and parent questionnaires were developed using the themes and subthemes identified from the framework analysis of the interviews. The patient questionnaire consisted of 19 questions while the parent questionnaire consisted of 23 questions. The questionnaires were divided into sections following the main themes in the framework analysis. The questions and their responses were designed to be simple, short and easy to understand, especially for the patient questionnaire, where the wording was as child-friendly as possible. Questions were specific to generate accurate responses. The following concepts were used in designing the questions (De Vaus, 1996; Liamputtong, 2010):

- Use simple language.
- Keep questions short and specific.
- Avoid ambiguities.
- Avoid loaded words.

- Avoid leading questions.
- Do not overtax the respondent's memory.
- Avoid hypothetical questions.

A combination of open and closed questions were used to develop the questionnaires. For closed questions, possible responses identified from the interviews were listed and it was made clear if the respondent had to choose one answer or could select multiple answers. Whenever possible, the responses followed a simple tick box approach. At the end of each question, an extra option was offered where participant could put their own views if there were not provided already. A small number of open questions were used to explore certain areas of interest.

3.3.4 Piloting the questionnaire

Several drafts of both questionnaires were developed. They were then piloted with 4 patients and their parents who were excluded from the final sample in phase 2 of this study. All participants received a brief verbal explanation about the study and were provided with an information leaflet, followed by signing the relevant consent forms. Participants were informed that this was a pilot study and that the questionnaires were still being developed. This step aimed to assess readability, validity, reliability and acceptability of the questionnaires. Patients and their parents were asked to mark any unclear questions or responses and to add anything they thought might improve the quality of the questionnaires. Appropriate amendments were then made to the questionnaires before being submitted to the Ethics Committee for final approval, which was obtained on March 2014 (Appendix 19).

3.3.4.1 Readability

The readability of both questionnaires was assessed using the Flesch Reading Ease™ and Flesch Kincaid Grade Level™ in Microsoft Word. Readability tests ratings are based on the average number of syllables per word and words per sentence. The Flesch Reading Ease™ rates the documents on a 100-point scale. The higher the score, the easier it is to understand the document (Flesch, 1948). Flesch Kincaid grade level™ on the other hand rates the documents on a U.S. school grade level.

3.3.4.2 Validity

Assessing the validity of a research questionnaire means examining its ability to evaluate the full scope research question (Black *et al.*, 1998). There are two types of validity; external and internal. External validity indicates that the results of the study can be generalised. Although the questionnaires were based on interviews with only a small number of participants, it was hoped by distributing to a reasonably large number of patients/ parents would give some generalizability to the findings. It is however accepted that this study is only in one hospital and will therefore limit the external validity. Internal validity is defined as how precise the questionnaire is, and how well it measures what it aims to measure. There are three types of internal validity including face, criterion and content validity (Williams, 2003; Colorado State University, 2011).

3.3.4.2.1 Face validity

Face validity means that the questionnaire can be understood by those it was designed for. The questionnaire had face validity by virtue of the fact it was developed from patient/ parents interviews. Additionally, participants involved in the piloting phase contributed to the face validity by giving their opinion (Colorado State University, 2011).

3.3.4.2.2 Criterion validity

Criterion validity can be assessed by comparing a new questionnaire with an existing 'gold standard' scale. This form of validity was not used for this study because such a standard does not exist. In addition, it was a questionnaire aimed at obtaining subjective opinions rather than being a quantitative questionnaire to measure specific trait (Colorado State University, 2011).

3.3.4.2.3 Content validity

Content validity is a measure of how well the questionnaire questions measures the component being investigated. The questionnaires have good content validity because they were developed from patient/ parent interviews (Colorado State University, 2011).

3.3.4.3 Reliability

Reliability is an assessment of the reproducibility and consistency of an instrument and it can be assessed by test-retest and the inter-rater method. Test-retest reliability is when the same questionnaire is given to the same subject on two different occasions but this was not relevant for this study because the questionnaires were assessing the participants' opinions. inter-rater reliability assesses the internal consistency of the questionnaire and, again, is not generally assessed in questionnaires assessing subjective opinions (Trochim, 2006).

3.3.4.4 Acceptability

All of the participants interviewed in the pilot study were asked to write comments on the questionnaire to emphasize any unclear questions, any points they could not understand and to suggest any improvements or extra responses to be added the list. Amendments made subsequently, aimed to enhance the acceptability of the questionnaires.

3.3.5 Questionnaire data analysis

Patients and parents responses to the questionnaires were transferred into SPSS® spreadsheets (Appendix 20 and Appendix 21) independently for simple descriptive analysis. Additional Excel spreadsheets (Appendix 22 and Appendix 23) were created to enter data for open questions including questions number 12 and 22 in patient's questionnaire and questions number 13 and 23 for parent's questionnaires or any additional comments they made. Simple statistical analysis were conducted for each question and to compare findings of patients and parents together. Chi-square tests were used to compare between groups.

Chapter Four

Results- Phase I

4 Results of Phase 1: In-depth interviews

4.1 Demographic data

In-depth interviews were conducted with 10 patients attending the Paediatric Dentistry clinics at the Eastman Dental Hospital; 7 (70%) patients were males and 3 (30%) were females. The average age of the patients was 11.6 years ranging from 10 to 14 years at the time of the interview. Eighty per cent of the patients were from a white British background and the other 20% were from other ethnic groups. Eleven parents were interviewed, including 5 mothers and 6 fathers. Ten of the parents were 'paired with the patients and one parent was interviewed but not their child, as he felt tired following treatment (Table 4-1).

Patient ID	Age	Gender	Ethnicity	Parent	Type of trauma	Time since trauma
1	11	Male	British	Mother	Avulsion	4 months
5	13	Female	British	Father	Avulsion	26 months
7	13	Male	British	Mother	Enamel-dentine crown fracture	> 3years
8	12	Male	British	Father	Enamel-dentine crown fracture	23 months
10	11	Female	British	Father	Complicated crown fracture, subluxation	18 months
15	11	Male	British	Father	Complicated crown fracture	30 months
22	10	Male	Asian	Father	Complicated crown root fracture	15 months
29	11	Male	British	Mother	Enamel-dentine crown fracture, complicated crown fracture	7 months
36	-	-	-	Mother	Avulsion, root fracture	>3years
48	10	Female	Mixed race	Mother	Complicated crown fracture	21 months
53	14	Male	British	Father	Concussion, infraction	3 months

Table 4-1 Patient and parent demographic data

All participants were mid-treatment. Three patients (30%) had trauma to a single tooth, while 7 (70%) had trauma to more than one tooth. The types of trauma are shown in in Table 4-1. The most common dental hard tissue trauma was complicated

crown fracture and avulsion was the most common periodontal injuries. The majority of patients (90%) had been referred by their local dentist, but one patient was referred by the school nurse as an emergency appointment.

The average length of the patient interviews was 19 minutes, ranging from 11 to 25 minutes. The length of the interviews for female patients ranged from 15 to 24 minutes (average 19 minutes) and for the male patients from 11 to 25 minutes (average 19 minutes). The average duration of parent interviews was 29 minutes, ranging from 10 to 50 minutes.

4.2 - Patient interviews

4.2.1 Framework analysis

Ten main themes were identified after analysing the interview transcripts. Each theme also incorporated subthemes as shown on Table 4-2.

1. Background	
1.1.	Age
1.2.	Ethnic background
1.3.	Year in school
1.4.	Hobby
1.5.	Type of trauma
1.6.	Teeth affected
1.7.	Who assessed them immediately following trauma
1.8.	Time between trauma and interview
2. General information seeking behaviour	
2.1.	How (written, verbal, internet videos)
3. History of trauma	
3.1.	How the trauma happened
3.2.	Immediate action/ what happened next
4. Information needs	
4.1.	Initial concerns/ information need following trauma
4.2.	Information provided in the first appointment following trauma
4.3.	Concerns/information need during treatment
5. Verbal information	
5.1.	Information from dentist
5.2.	Information from others (parents, siblings, friends, others)
5.3.	Remembering verbal information
6. Written information	
6.1.	Information leaflets
6.2.	Other forms (booklets, books, magazine, summary letters)
7. World Wide Web	
7.1.	Use of the internet
7.2.	Advantages and disadvantages of internet
7.3.	Reliability of information
7.4.	Use of the internet to find information about trauma

7.5.	Search terms
8.	Other sources
8.1.	Videos/DVDs
8.2.	Other media (TV/Radio)
8.3.	Smartphone applications “App”
9.	Information Seeking Behaviour and Trauma
9.1.	Preferred method of receiving information
9.2.	Amount and timing of information provision
10.	How to raise public awareness regarding trauma
10.1.	Media (TV, Radio/ newspapers and magazines)
10.2.	Posters
10.3.	Information leaflets
10.4.	Dentists
10.5.	Websites
10.6.	School/ sport personnel Campaigns
10.7.	Others

Table 4-2 The main themes and subthemes identified from the framework analysis of the in-depth interviews with patients.

4.2.1.1 General information seeking behaviour

The patients were asked about the ways they look for information in their every day life, this question gave them an idea about the objectives of this study, and allowed a rapport to be developed with the patients before asking them more specific questions about their dental trauma.

Interviewees were asked about the methods for obtaining information for school assignments or in their everyday life. All used written sources (books, textbooks, booklets) to look for answers for their homework. The following quotes were taken from the interview transcripts, the number represents the patient ID in the study followed by the number of the line in the transcript.

[P8: 40-41] ***“Well, I have a textbooks... I usually just look back through the book or in my textbook”***

[P22: 25] ***“I sometimes go to the library”***

Some of the patients sought general information from a relative (usually parents or siblings), or schoolteachers.

[P22: 36] ***“If I get stuck I go to my parents and ask them”***

[P1: 32] ***“The teacher helps us”***

Participants also used the internet as a source of information, however, some used it only if their schoolteacher asked them to or provided them with a link for a certain assignment. Others used the internet to look for something they were interested in, for example sports, Facebook and online shopping. Others rarely used the Internet or actually tried to avoid it. Some children stated that their school had a special programme or webpage where students could visit to do their online assignments. Only one of the interviewees reported the use of the Internet to look for health related issues.

[P8: 50-51] ***“I try to avoid it [internet] when not needed because the teachers do not especially like it’...but if they [teacher] say use it for search then I usually take advantage of that and use the internet”***

[P22: 222] ***“I only look on the internet for things like, not like about my health”***

One patient indicated that seeking information on the Internet helped him feel more involved in school.

[P8: 68-71] ***“I quite like general knowledge and at school it helps a lot, because sometimes in class we talk about stuff... I can get involved more”***

Some of the interviewees reported using videos as a source of information and most said they would look on YouTube if they were interested in something.

[P7: 43,47,55] ***“Yeah, I watch videos... [in] YouTube’...’to like learn to try new stuff”***

However, others said they never used this source.

[P15: 237] ***“I don’t really use YouTube much”***

4.2.1.2 History of trauma

All of the patients who were interviewed had trauma while they were playing or doing sports either inside their house, at school or in play areas. The majority of the participants sought help immediately and were seen by a dentist either in an immediate emergency appointment, or soon after the trauma. One patient was seen first by the school nurse and was then referred to a dentist. None of the patients knew the technical name or “diagnosis” of the type of trauma they had.

4.2.1.3 Information need

4.2.1.3.1 Initial concerns

Patients were asked about their concerns at the time they had their trauma and when they were first seen by a dentist. One patient reported concerns regarding which teeth were affected, how bad the trauma was and what had actually happened to them. Other participants wanted to be reassured and to know if their teeth were going to be alright.

[P5: 85-89] ***"I wanted to know specifically which teeth were affected and what had actually happened to them because at school nobody was telling me what had actually happened ... which made it scarier because I didn't know if it was really dire or not, but it felt really bad but I just wanted to know what specifically was wrong"***

Patients also wanted to know what was going to happen to their teeth, including whether the dentist would be able to restore or re-implant their teeth in case of avulsion.

[P10: 198-201] ***"Probably what they were actually doing to my tooth because you know, obviously I didn't know what was really going on so. I knew that they were putting it back in and doing, you know what they needed to do but I didn't know what it was at that point so I think that was a bit kind of not knowing what was happening"***

[P15: 124-125] ***"I did want him [dentist] to tell me what was going to happen to them [teeth], cos I had no idea cos it was like only a local dentist, he'd never really dealt with this kind of stuff"***

Some were also concerned that their teeth may need to be extracted or may fall out, and were worried what would happen then.

[P22: 97-99] ***"Like if I have to take it [tooth] out, or if I'm gonna keep it, or if... they don't take it out, this will happen, and if they do take it out, that will happen and that's most of the things"***

[P53: 169, 173] ***"I thought maybe the tooth could fall out or something like that... because...it started to slightly wobble"***

[P10: 176-178] ***“Because it [tooth] came out they did say there was quite a strong possibility that it, the nerve would die and my tooth would come out. So I think that was kind of a constant worry but that was from the beginning”***

A small number of the participants were worried that the tooth/ teeth would become non-vital. Some of the patients expressed concerns regarding pain, either during the dental procedure or during function.

[P22: 87-90] ***“I wanted to know if it’s gonna hurt...if they need to do something, if it, is it going to hurt, and I felt a little bit scared”***

[P29: 114-118] ***“I was worrying about eating and whether I’d have any pain and things...Like if I bit into something and then it hurt”***

Some patients could not remember discussing their concerns because they were still in shock after the trauma.

[P15: 127-133] ***“I was a bit like, I was still in shock so I didn’t really ask any questions”***

4.2.1.3.1.1 Information provided in the first appointment following trauma

The majority of the patients received an explanation regarding what had happened to their teeth in simple terms. Participants also reported that they received information regarding the short and long-term treatment plans. Some were informed that they would need to be seen by the dentist for regular check-ups and a small number of patients were told about the possible complications that might occur during treatment. This information was provided either by the patient’s general dentist or by their dentist at the Eastman Dental Hospital (EDH).

[P10: 222] ***“They just kind of said in kind of simple terms what had been done and again, kind of basic terms of what they planned they do and how everything would hopefully work out”***

[P15: 139-142] ***“Well, they told me that... we’re gonna put some temporary fillings on you and that when you’re older we’ll put crowns on. And that they’re gonna, your teeth are very fragile and... They didn’t tell me this straight away, but later on they told me that my nerves are probably gonna die”***

[P5: 10-103] ***“She [dentist] told me exactly what had happened to the teeth and that’s all I really wanted to know at the moment. She also told me what she was***

going to do which helped because I like to know before I get in the chair what's going to happen"

4.2.1.3.1.2 Concerns /Information needs during treatment

Some patients reported concerns during treatment including concerns about loss of restorations; and how many times restoration could be repeated.

[P8: 136-137] *"I wanted them to tell me that, um, well how many times it could be redone [filling]. I did not know if it could be like, it had a maximum or if the tooth got exhausted"*

[P29: 146-147] *"I thought it might come off, because my dad's crown fell off and I was worried that mine might fall off, even though it wasn't a crown"*

Some of the children were also worried about the consequences of having further trauma to the same teeth.

[P8: 138-140] *"I wanted to know like if I knocked it [tooth] again and something else might have happened, what if maybe I lost a bit more of the tooth it would have been fragile, what would they [dentist] have needed to do?"*

Interviewees also reported concerns about pain or the tooth feeling uncomfortable; particularly during eating/biting or during dental procedure.

[P29: 6-11] *"It's sometimes quite hard to eat at school because I have to eat on these [back] teeth...because my front two, it hurts if I bite onto a hard object or something"*

[P53: 202-203] *"It [tooth] was knocked backwards a bit so every time I tried to bite something, or something like that, it would feel weird"*

[P22: 128-132] *"I'm nervous about like when it's gonna be taken out and if the pain's gonna be really painful...I mean like during it's taken out"*

Interviewees were concerned as to whether they would be able to have orthodontic treatment following the trauma. Some were worried about having root canal treatment.

[P10: 179-181] *"I have quite a big overbite I was kind of worried that because my tooth would not be strong enough, they wouldn't be able to put braces on so I did think that kind of worried me a bit but not hugely"*

[P15: 146-147] ***“I don’t like the sound of nerves dying. I still, I don’t, it still doesn’t sound nice, and it’s not nice”***

Patients were also worried because they experienced gingival bleeding whilst brushing. One participant was not happy about the colour and the sharpness of his tooth.

[P1: 106] ***“They just like bleed when I brush them sometimes, not all the time”***

[P53: 239-240] ***“It did turn black slightly a bit and yeah, and I think like just under here, this one compared to my other teeth, is not as sharp”***

4.2.1.4 Verbal information

The majority of interviewees had spoken either to their family dentist or their dentist at the Eastman Dental Hospital regarding their teeth. Some of them also spoke to a family member, friend or a friend’s parent. One patient found it helpful to share information about what happened to their teeth because it provided reassurance.

[P8: 88-89] ***“Yeah. Because it’s nice to know that it’s not just me, that obviously it’s quite a common thing and it’s not like something which I should be too much alarmed of”***

Some interviewees spoke to their parents because they had previous personal experience of trauma or because they trusted them.

[P29: 40-42] ***“My dad’s had root canal treatment done and everything, so he answers most of my questions for me, so I don’t really need to look anything up”***

[P7: 346-347] ***“I kind of know quite a bit and my mum’s always asking people and then she tells me... but for other people I think it would be quite useful”***

The majority of patients preferred their dentist as a source for information because they trusted him/her and felt they had the necessary experience. They tended to also prefer verbal over written information. Only one patient said they would rather obtain information from their mother than from their dentist.

[P1: 148] ***“Better for him to say it [information] because I don’t really understand it when I read”***

[P5: 177-180] ***“I find it easier sometimes just to listen because I find then I can ask questions as well. Because not, sometimes not all of my questions are***

answered in a leaflet but I find it easier in an appointment because the same information is given but I can ask detailed questions and get detailed answers”

Several participants felt it was hard to remember all of the information provided by the dentist, and some of them thought it would be helpful if they were provided with other sources of information. The reasons they forgot the information provided varied; some stated that they were in shock at the time of the initial trauma and it was difficult to remember the information given and others mentioned that the dentist spoke mainly to their parents.

[P10: 234-240] ***“Not really..., I think they [dentists] kind of spoke quite a lot to mum and dad instead of kind of directly to me so I think and then I kind of missed what they were saying due to that”***

Information retention appeared to improve at follow-up appointments as the patients tend to feel more relaxed.

[P5: 144-151] ***“When I first came in apparently I was in shock so it was quite hard to kind of process everything ... But now it's much easier because yeah, I'm feeling much better and it's just easier to kind of cope with”***

4.2.1.5 Written information

4.2.1.5.1 Information leaflets

The majority of the interviewees said they would read an information leaflet about trauma if it was provided, and they thought it would probably be helpful. Some said they would only read it if it was offered by the dentist and others would be interested if they saw their parents read it. They thought it would be helpful to have a leaflet as a reminder if they forgot what the dentist had told them verbally. Some also mentioned that the leaflet would be helpful for reassurance if any changes occurred to their teeth.

[P29: 338-340] ***“Yes, because then you could look through it [leaflet], like when you go home and things, and read the information and look at the pictures to see what will happen to your tooth, because when it happens you can't actually see it”***

[P53: 302-303] ***“Like maybe give a sheet of information or something like that, just like for a reminder or something to say”***

Patients were satisfied with the amount of text on the leaflet they were shown as an example; they thought the amount of information was just about right. They wanted

the leaflet to be clear and colourful and liked the way the paragraphs were presented with simple bullet points.

[P7: 265-266] ***“It’s good because there is not, it doesn’t look like a lot of writing but it’s still got carried a lot of information”***

[P29: 306-307] ***“Well it’s sort of like folded over so you can read it, it feels like there’s less to read because it’s all folded”***

[P53: 331-333] ***“It’s like the colours and everything; it kind of stands out and like it has quite simple points so it’s easy to understand. Yeah and it’s just like putting it in order where there’s paragraphs and everything”***

Other interviewees made comments about the design of the leaflet and mentioned that it was ‘boring’ and ‘not very eye catching’.

[P7: 249,257] ***“Its kind of plain at the moment, it’s not very eye catching... like more colours instead of just the same”***

A small number of interviewees did not like the concept of an information leaflets at all because they are not specific to each individual patient, and the answers for their questions could not be found in one leaflet.

[P5: 177-180] ***“Sometimes not all of my questions are answered in a leaflet but I find it easier in an appointment because the same information is given but I can ask detailed questions and get detailed answers”***

The majority of the patients felt that it was important to include pictures in any leaflets provided. Most of the patients said they would prefer clinical photographs. Some interviewees suggested having groups of pictures showing what the dentist is going to do and the types of trauma with different degrees of severity.

[P8: 179] ***“Maybe one or two pictures.. of what would happen and how it’s going to be okay”***

[P7: 217,219,224] ***“Telling you how bad the accident is by like having different pictures of like a bad one, a kind of medium one and a not that bad one...I am just saying that just for so you can just recognise it”***

Some of the respondents suggested including pictures of the possible outcomes or complications so they would feel reassured if any of these problems happened to them. However, others said they would feel anxious with this sort of information.

[P8: 185-187] ***“I think natural pictures are good because if it was to be like made to look pleasing... if something happened that it would naturally happen and someone looks at the booklet, they might think "oh well this booklet said that this is going to look, what my tooth would look like but it looks like this”***

[P8: 189] ***“But not too many pictures like the blackened teeth [caries] or stuff like that”***

One interviewee suggested having different leaflets for younger and older children, where the leaflet for younger children could be more ‘child friendly’ with cartoon pictures rather than clinical photographs.

[P22: 181-183] ***“If a child looked at this [photographs], I think they would probably laugh... You could put like cartoon teeth and make it like... like friendly”***

Most of the children liked having a blank area at the end of the information leaflet where they could write their own questions to ask their dentist at the next appointment.

[P29: 346-351] ***“Have a blank piece of paper [at the end of leaflet] so you can write questions...because then, if it was a month later, you might have forgotten all your questions”***

4.2.1.5.2 Other types of written information

A small number of patients said they would look for information in books, however, the majority said they would not use books as a source for information. One interviewee stated that he would not look at books because he could get the same information from the Internet.

[P53: 533-535] ***“Like it would be more handy to go on the Internet looking for that because you’d have to go to the library and things like that and search for the book and you’d probably get the same information on the internet as you would get in a book”***

One interviewee cited booklets as a good source for information because they can provide patients with detailed information about their condition and available treatment options.

[P53: 374-375] ***“Maybe pictures and stuff like that, like stuff to see, and to be different. Like a booklet would probably be slightly longer than this [including the leaflet] so you could do it in more detail”***

Some patients would have liked to receive a summary letter about what happened at their appointments and what had been said, so they could store it and remember the dentist's instructions. One patient said they would prefer this over a regular information leaflet because it would be more specific to each individual.

[P10: 245-248] ***"Eastman's do usually send letters, kind of like if I have an appointment or something they will kind of recap what has happened with the trauma to the tooth so I think that does help but I'm not sure because you know, no one can ever remember everything that happens"***

[P10: 453-455] ***"I think the letter kind of more appeals to me because it would be then after your appointment so it's specifically to you saying, you know, saying what's happened to you and what they're doing for you so it's more for you"***

4.2.1.6 World Wide Web

Only one of the patients interviewed had looked on the Internet for information regarding his traumatised teeth, he had experienced an abscess after the trauma and wanted to know how it would be treated.

[P53: 107-108] ***"I did actually once because I had like not an abscess but like a build-up of fluid, I just wanted to check like how you would do it, like if you, how to sort it"***

One interviewee mentioned that she would look on the Internet only if there was a trusted dentist who provided her with information regarding where to search.

[P10: 310-311] ***"Unless it was like a dentist, a proper dentist like but then you're not really to know if it's real or not so no, I wouldn't really use the internet"***

Other interviewees said they did not look for information on the Internet because they thought it might make them more anxious or because they thought they might not be able to understand the information. The majority said they would not visit websites even if they were provided with a link.

[P10: 272-274] ***"No, to be honest I think I was kind of... not brave enough to look because you know in case something that maybe wasn't true but just came up and then you're kind of worrying"***

[P5: 221-223] ***"Well because... all my teeth were damaged in different ways and.. I wouldn't [look in the internet], because the Internet can sometimes come up with really complicated stuff which I don't understand"***

Interviewees were asked what search terms they would use if they wanted to look for information regarding trauma and gave suggestions summarised in Table 4-3.

The main perceived advantages of the Internet were that it is easy to use and

Patient ID	Search term(s)
5	Trauma signs, treatment for root canal
7	Tooth, what to do, tooth trauma
8	Common accidents for teeth
15	Tooth problems, root canal
29	Fell over
35	How to solve an abscess, how to solve it, fluid or something to the gum, what an abscess kind of is, gums, gum damage

Table 4-3 Summary of search terms the patients would use to look for information regarding dental trauma on the internet

readily accessible. Some patients mentioned that everything can be found on the Internet and it is better than asking other people.

[P8:69] ***"It's quite handy"***

[P7: 99] ***"It's simpler to use and because like not everyone might know about what you want them to, what you're asking them about whereas the internet has everything"***

The disadvantages were mainly associated with the reliability of the information especially with Wikipedia.

[P7: 306] ***"Wikipedia but that's kind of not really very reliable"***

Most of the interviewees used more than one website to ensure the reliability of the information. Some used Wikipedia as a first reference then searched on other websites, but others avoided Wikipedia and WikiAnswers altogether when looking for information on the Internet. One participant used different search terms to check reliability of information and others cross-referenced the information by referring to her parents.

[P8: 212-213] ***"I'd look at five or six different websites [look for similarities] but I try to avoid stuff like WikiAnswers or Wikipedia because I wouldn't rely on that"***

[P29: 216] ***“Wikipedia, then I go onto another one to see if the facts are correct and things”***

The majority mentioned that they would read the summary text below each website link in the search result page, to help them choose the most relevant websites.

[P15: 90-92] ***“Under the website I read the little caption, and then I see which one looks the most reliable, I’d probably use that one. Out of the like say first five or ten, I would click on the one that looks most reliable”***

A small number of interviewees clearly stated that they would not look for information about their teeth on Facebook.

[P7: 399] ***“I don’t really look on Facebook to look for something about my health.. I usually use it for socialising and stuff”***

Others were interested in reading online articles about trauma on children’s science websites.

One interviewee thought having the dentist’s email would be beneficial; from which, advice would be based on individual cases according to the patient’s record.

[P10:316-319] ***“That would be good because you could ask them the questions that was on your mind and then they could give you an answer according to your records or whatever so that would be, yeah that would be good, to set up an email account”***

4.2.1.7 Other Sources

4.2.1.7.1 Videos

Some of the patients showed an interest in watching a video giving information regarding dental trauma. One patient mentioned that he would watch it if he had experienced a severe traumatic injury and another child said he would watch it if it showed him what to do if trauma happened. Some interviewees said they would prefer to watch videos rather than asking people questions, and others mentioned that it might help them remember what the dentist said.

[P7: 420] ***“Yeah probably [would watch a video regarding trauma] it depends like, if it [trauma] was quite bad then yeah”***

Some interviewees said they would not watch videos regarding trauma because it might actually show the trauma, which they would not want to see.

[P53: 490-491] ***“I wouldn’t really, I think it’s a bit like say gruesome or something because you wouldn’t really want to see a tooth like being smashed or something like that”***

Patients thought it would be useful for people to see what to do and where to go if a traumatic incident occurred, and what to do if they had avulsed or fractured a tooth.

[P7: 407-408] ***“You could make videos about, what you should do when somebody hits their teeth... which show like what sort of practice you should go to”***

4.2.1.7.2 Media

Some of the participants said they would obtain information from the television although two interviewees acknowledged that currently there is little information available on the television regarding dental problems.

[P10: 330-332] ***“There’s not really much on the news about you know dental hospitals or your tooth coming out so I think, I don’t know, I haven’t really seen many or heard of much that talk about your teeth”***

One participant stated that having a programme about dental trauma would not be helpful, because of the misinterpretation that might happen without direct communication between the dentist and patient. Some interviewees stated that people would only watch a television programme about trauma only if they had experienced trauma themselves because only then, would they be interested in knowing more about it.

[P22: 231-234] ***“Well, if there was a TV programme on about stuff we were learning or about our health, then something that happens... to me and I wanna know more about it, and if it was on the TV, I would, I think I would watch it, but it... as long as it would be like interesting”***

A small number of interviewees said they would be interested in reading a newspaper or magazine article regarding trauma.

[P10: 354-357] ***“I don’t know if there are any kind of magazines, sometimes they have a problem, like agony aunts or whatever, I think that would be quite a good way to kind of relate to people”***

One child said that dental advice should be placed before or after a well-known page like the sports page, or even the front page of the newspaper so everyone would notice it.

[P53: 555-558] ***“I’d say maybe after like a well-known thing such as sport, maybe put it before it or after it so you would know. So you could flick through the sports pages and then you would see that after it and you would be able to see it. Or put it on the front where everyone would be able to see it”***

4.2.1.7.3 Smart phone application (“APP”)

One patient talked about having a trauma “APP” on his phone; however, he stated that people would probably only be interested if they had experience trauma.

[P53: 526-528] ***“It would be helpful if I did have it [phone application] but like you say, if someone who didn’t have it [trauma], it wouldn’t be so helpful and they probably wouldn’t go on it”***

4.2.1.8 Trauma Information seeking behaviour

4.2.1.8.1 Preferred method of receiving information

All interviewees were asked their single preferred method for receiving information regarding trauma (Table 4-4). Only one patient preferred verbal information from the dentist as their preferred source of information.

[P29: 457] ***“Definitely the dentist”***

Two patients preferred written information as information leaflet as their preferred source of information and one patient favoured the summary letter.

[P15: 263] ***“I think I’d prefer the leaflet”***

[P10: 492] ***“I think the letter”***

One patient chose media (television) as their first choice.

[P22: 250-252] ***“I think I’d prefer... a television, because most kids, and including me, we, everyone likes watching telly, TV, so then if they see it they might watch it. But some kids might not watch it”***

Another patient considered the Internet their preferred source.

[P 53: 645-646] ***“The first source of information if I knew, like if I knew it was properly right would be the internet”***

Patient ID	Preferred method
5	Leaflets
10	Summary letter
15	Leaflet
22	Television
29	Dentist
48	My mum
53	Interne

Table 4-4 Patients’ most preferred source of information

4.2.1.8.2 Amount and timing of information provision

The majority of the patients were satisfied and felt happy about the information provided.

[P10: 218] ***“I’ve been told, you know, most things”***

[P15: 275-176] ***“I’m actually quite happy now cos I don’t think there’s anything I don’t really know”***

Some patients made suggestions about when they felt was the right time to provide this information. The majority of patients thought information should be provided in stages. At the first appointment, one patient just wanted the dentist to explain her condition without any details about the treatment options. Other patients wanted to have an overview about the treatment plan but without details. All agreed that they would like the dentist to then provide further details in the follow up appointments.

[P53: 273-274] ***“I think he [the dentist] should do it stages”***

[P5: 156-196] ***“I think it’s easier in the first appointment... it was easier just to know what was wrong with my teeth and not to go into all, and what they were***

going to do and not all the kind of technical stuff, and then in the follow-up appointments to kind of tell me in more detail. I think when I first came away all I really wanted to know was what was wrong and what they could do to help"

4.2.1.9 Raising public awareness toward trauma

When interviewees were asked how to raise the public awareness regarding trauma, participants suggested the use of adverts in the media (television and radio). However, one patient stated that people would generally not have the interest to look for information on TV.

[P7: 438-442] ***"You could advertise it on television.. Yeah and the Radio"***

[P10: 486-488] ***"Because you know most people, nine out of ten people do listen to the radio or watch TV kind of a day. So I think, and in the media would be the best way to get the message"***

Some thought these advertisements should show a simple trauma scenario: how it could happen, what to do if it happened and how to store the broken or avulsed tooth, so that people would know what to do if trauma happened to them. Some thought it would be helpful to have a patient talking about their experiences. One interviewee thought TV advertisements should be during, or after, a well-known television show to make sure everyone saw it.

[P53: 587] ***"Maybe put an advertisement that like everyone would be able to see.. just to like let people know what happens if it happened to you"***

[P15: 226-233] ***"You should probably say stuff like...this could happen to you one day, imagine playing, you're playing a game in the park, suddenly you trip over and knock your teeth out. What are you going to do? Well, first you should keep the teeth, the dentist may be able to stick them back on, you should, keep them in milk to keep them strong... and then you should get home and go to the dentist as soon as possible... and if you do this quick enough we'll be able to stick them on, if you don't do this you may have to have root canal and root canal involves all that"***

Posters were the second most commonly suggested method to raise public awareness. Interviewees suggested placing posters in places where trauma commonly occurs, like sport areas. Some suggested placing the posters in everyday places like shops or railway stations so that everyone can see them and because trauma can happen anywhere.

[P8: 265-267] ***"It could happen anywhere it's not easy to tell everyone but in a common place to happen, like hockey or water slide, then maybe signs or just like heads up would be a way to prevent it I reckon"***

[P10: 388-389] ***"Maybe like places, like maybe if you're playing football or cricket or something like that... or put it on like a poster on the wall"***

[P53: 608-614] ***"Like buildings or something like that which are well known or put them in a populated place...like even outside the station at St. Pancras, a lot of people go there so they would know"***

Patients felt that the information which should be available on these posters included: visiting the dentist as soon as possible, reassurance, what to do if trauma happens, advice regarding how to store broken or avulsed teeth and instructions to wear a mouth guard for sport to avoid trauma in the future. One participant suggested different posters for trauma to permanent and primary teeth.

[P29: 406,411,416] ***"Don't worry', because some people might worry about it...The dentist can help you, so don't be scared', and things like that...and if your mom and dad isn't there, tell your mom and dad so they know"***

[P53: 588-589] ***"Maybe posters or something just to like let people know what happens if it happened to you"***

A number of the patients recommended distributing a leaflet regarding trauma. They suggested placing them in dental practices, hospitals or places where trauma commonly occurs like sport areas. Information which they felt should be available in these leaflets included: reassurance, individual experiences and what to do if trauma happens.

[P29: 388-389] ***"Maybe like places, like maybe if you're playing football or cricket or something like that"***

[P15: 207-210] ***"You could try like maybe at the dentist, you could ask people who go to the dentist, like you could put up leaflets in hospitals and dentists saying like, "If you knock your teeth out, find them, bring them, we can be able to stick them back on and it'll be fine." So you could do that"***

Advertising or providing information regarding trauma through the newspapers or magazines was also thought to be potentially helpful.

[P22: 267] ***“We could put it in a magazine, because sometimes people look, or... or they could put it in the newspaper”***

[P15: 245-247] ***“You could put like catchy slogans like, “Lose your teeth, bring your teeth, then they can stick your teeth,” like if... you know in magazines you get those little adverts, you could do adverts with like catchy slogans and stuff like that”***

Patients thought that dentists could give general advice regarding trauma during regular check-ups and if the patient had already experienced trauma, the dentist could provide them with more specific advice.

[P15: 204-205, 208-210] ***“You need to tell them before they knock it off, otherwise it’s too late’...’ dentists saying like, “If you knock your teeth out, find them, bring them, we can be able to stick them back on and it’ll be fine.” So you could do that”***

[P8: 272-274] ***“Maybe just dentists could say like in one of your check-ups, you know, say ‘do you play a lot of sport?’ and if you play a lot ...”you should be a bit careful about this” and tell the dentist to tell... their patients”***

There was a positive response to the idea of having a website regarding trauma and some interviewees suggested putting the link to the website on any leaflets. One patient thought it would be helpful to raise public awareness by giving ‘professional advice’ on the internet.

[P7: 367-373] ***“Well you could give them like website address that have like good information on them.. You can put them [link] on the back there [leaflet]”***

Several patients said it would be useful to have a campaign regarding trauma, where a dentist could go into schools, and explain to staff and students what to do if trauma occurs.

[P8: 272] ***“To send someone, like a dentist to a school”***

Respondents believed that schoolteachers or sports personnel should be trained to give children advice to reduce the risk of trauma.

[P8: 259] ***“To tell like in school, if they were playing hockey the teacher...someone should tell the teacher to tell all the people playing, you know “be careful”***

[P29: 388-391] ***“Tell the PE teachers... and just tell people who might have to deal with [trauma], there might be someone knocking out their teeth, just tell them, so they can like tell the staff what to do, to tell the person what to do”***

One patient stated that wearing a mouth guard should be set as one of the rules before playing sports.

[P53: 630-632] ***“Someone put in a rule and say that if you don’t wear it [sportguard] you cannot play. So just like rugby, like you’re not allowed to play, there’s still like things like football that it’s not compulsory to use it but you could still get the same, you could get a worse injury”***

One of the interviewees also suggested having a mailing list for patients visiting the hospital, and sending them a information leaflets or even a link to a webpage regarding trauma.

[P7: 137,387] ***“On the letter where they have to like write to the hospital or like once they leave [the appointment], just like write their address, so then you can send them a leaflet...’you could email them or Phone them the [web] address”***

It can be seen that the patients interviews raised many interesting points regarding how to provide information to patients following trauma, and also how to raise public awareness about dental trauma. The results for the parents’ interviews are discussed in the next section, before discussing the results for both sets of interviews.

4.3 Parent interviews

4.3.1 Framework analysis

Eight main themes were identified after analysing the parents' interview transcripts. Each theme also incorporated subthemes (Table 4-3)

1. History of trauma
 - 1.1. Initial feeling
 - 1.2. How the trauma happened
 - 1.3. Immediate action/ what happened next
 - 1.4. Difficulties faced/ causes of frustrations
2. Information needs
 - 2.1. Initial concerns
 - 2.2. Quality of information provided
 - 2.3. Concerns during treatment (short-term concerns)
 - 2.4. Long-term concerns
3. Verbal information
 - 3.1. Information from dentist
 - 3.2. Information from others (parents, siblings, friends, others)
 - 3.3. Remembering verbal information
4. Written information
 - 4.1. Information leaflet
 - 4.2. Other forms (booklets, books, summary letters, newspapers, magazines)
5. World Wide Web
 - 5.1. Use of the internet
 - 5.2. Advantages and disadvantages of internet
 - 5.3. Reliability of information
 - 5.4. Use of the internet to find information about trauma
 - 5.5. Search terms
6. Other sources
 - 6.1. Videos/DVDs
 - 6.2. Other media (TV/Radio)
 - 6.3. Smartphone applications "App"
7. Trauma Information Seeking Behaviour
 - 7.1. Preferred method of receiving information
 - 7.2. Timing and amount of information to be provided
8. How to raise public awareness regarding trauma
 - 8.1. Dentists /doctors
 - 8.2. Teachers/ sport personnel
 - 8.3. Public release and advertisements
 - 8.4. Others

Table 4-5 The main themes and subthemes identified from the framework analysis of the in-depth interviews with parents

4.3.1.1 History of trauma

Parents were initially asked how their child traumatised their teeth, in order to engage them with the interview, and to understand their information needs based on their child's situation. The history of trauma was generally consistent with their child's history. The majority of parents were not with their children when trauma happened but they took them up at the hospital (n=5), emergency dentist (n=1), their child's general dental practitioner (n=3), general medical practitioner (n=1) or a relative who was a dentist (n=1).

4.3.1.2 Information needs

The parents who were interviewed expressed a variety of concerns regarding their child's traumatised teeth. These concerns were subdivided into three stages: initial concerns, concerns during treatment and long-term concerns.

4.3.1.2.1 Initial concerns

Some of the parents wanted to be assured that their child would be fine and wanted to know whether the trauma that had happened would have an effect on their child's health or general wellbeing.

[P15: 29-39] ***"I wanted to know whether there was any further threat to my son's health or wellbeing"***

One parent wanted to know where she should take her child after the trauma had happened in order to access the best treatment.

[P1: 46-47] ***"It was just a case of where to go and where to get him the best treatment really"***

Parents were also concerned initially about the possibility of saving their child's teeth and if there was a risk of losing them. Some of them also wanted to know exactly what had happened to the teeth. Parents expressed their worries with regards to what might happen to the injured teeth, whether their child was going to experience pain and if the teeth would lose their vitality.

[P5: 22-29] ***"Whether she was going to lose her teeth or not, that was what we were mainly concerned...Because they were very badly damaged"***

Initial worries also included the possible treatment options available and whether the teeth would require root canal treatment.

[P29: 42-43] ***“It would have been nice to know what the options were, what might happen, what might not happen, what they were able to do”***

Some parents were concerned about their child’s ability to cope with the treatment required, particularly one of the parents who had undergone root canal treatment herself.

[P53: 188-192] ***“How was he going to react then when the treatment started? Would he be okay ... it is quite intense and the needles and everything. So yeah, I suppose I was worried about how he was going to take that as well”***

Some parents were anxious about the effect that the traumatic injury would have on their child’s appearance and the resultant effect on their confidence and self-esteem.

[P10: 69-73] ***“We were worried...about the effect it would have on her confidence if she had a broken tooth that was so visible, it was right in the front of her teeth so it was very much when you smile it’s the first thing you would see. So ...how that would affect her going forward”***

4.3.1.2.2 Information provided

Some of the parents received information prior to their child’s appointment at the Eastman Dental Hospital. However, the majority of those parents were not satisfied with the amount information they had received and felt that it was not sufficient or was misleading. Others did not receive any information at all prior to attending the Eastman, usually because it was an emergency visit.

[P8: 24] ***“None whatsoever”***

[P29: 49-53] ***“I went to my dentist the next day... they said that the root had been exposed. They said to me ‘If nothing happens within the 10 days, then the tooth will have been saved. If he doesn’t get an infection and it doesn’t hurt within 10 days he’ll be fine, and he probably won’t need to do anything until he’s 17’, whereas in actual fact that’s not been the case at all”***

The majority of the parents were satisfied with the information provided to them at the Eastman Dental Hospital. They received clear and basic information regarding what had happened, what to expect to happen to the tooth, the possible course of

treatment, if the tooth/teeth were still vital and if the damaged teeth were likely to require root canal treatment.

[P15: 58-60] ***"We were sort of told clearly ... what had happened and what the implications were, and the reassurance that it could largely be rectified"***

One parent mentioned that she was satisfied with the information provided although some of the information was not explained in depth.

[P1: 95-96] ***"A little bit worried because things are not explained in too much depth"***

4.3.1.2.3 Concerns during treatment (short-term concerns)

The parents expressed different worries during the course of their child's treatment. They were concerned whether their child should avoid certain things such as biting on the damaged teeth, avoid certain types of food/drinks, or playing contact sports. Others wanted to know what to do if these teeth became symptomatic.

[P7: 328-333] ***"Should I put Bonjela, so it's like the inside of the mouth is really uncomfortable,... just what might be the best thing for them to eat because they get hungry and they're very sore obviously"***

One parent wanted to know if the root of the traumatised tooth could still continue growing following avulsion and the likelihood of it being ankylosed.

[P: 104-109] ***"Are the roots going to... re-grow? But I was told that they don't so, but the teeth where they've been put back in have fused to the bone. So one thing that does worry me is...whether he should bite on them or not bite on them"***

Some parents wanted to know the prognosis and if there was still a risk that the damaged teeth could be lost. They were anxious about what might happen, as even their dentist could not predict what might happen to those teeth in the future. Some of the parents were concerned about the aesthetics of the teeth and the restorative options available, especially if the restoration came off. As well as being concerned about aesthetics, they were also worried about the risk of infection if the restoration was lost and the tooth tissue was exposed. The change in colour of the teeth was also a reported concern for some parents and some reported that the aesthetics of the traumatised teeth had a significant effect on their child's self-esteem.

[P5: 39-41] ***“The question of losing her teeth is still the foremost issue because we understand that that’s still something that might happen”***

[P8: 77-80] ***“I don’t really have [information] of the prognosis, so what could happen, cosmetically how is it going? How can it be dealt with? You know, whether, they put a cap on it so...they built up a cap and it’s broken a couple of times which we knew might happen, had to bring him back”***

[P48: 59-60] ***“My daughter, since she broke her tooth, I can see her self-esteem went a bit lower”***

4.3.1.2.4 Long-term concerns

Some of the parents expressed their concerns about the possible long-term issues and wanted to know the prognosis of the teeth and the restorative options in adulthood. One of the parents was concerned about the expense of future treatment, especially if it included placement of implants.

[P36: 166-174] ***“My worry now is long-term. ...when he gets to 21 he’ll be fully grown ... he then has to make the decision does he continue with the plastic false teeth or does he then have to have implants, this will be of obviously financial issue, ... that’s my only concern”***

[P15: 31-34] ***“I wanted to know what the prognosis for the future of his teeth was...is it something that would be rectifiable in the long term or would there always be some kind of imperfection or substandard, you know... dental ability”***

Other parents were still concerned about sports and if their child should wear a sportguard whilst doing any type of sports. Some were also still worried about the long-term effects of the traumatised teeth on their child’s appearance and self-confidence.

[P10: 44-45] ***“We were worried about the long term effects for her of that [traumatised teeth] and obviously her self-confidence”***

4.3.1.3 Verbal information

4.3.1.3.1 Information from dentist

All of the parents had received information regarding the trauma from a dentist; either their own general dental practitioner (GDP), emergency dentist or their dentist at the EDH. Some of the parents mentioned that they preferred to receive information from

a dentist, as they could ask questions relevant to their child's situation, and dental professionals were the best people to answer these concerns.

[P15: 114-119] ***"For me it was really important to come from the dental professional and to have the ability to talk face to face and to understand"... "Because I had lots of questions that were specific to this situation, and obviously they were directly relevant to the immediate treatment. So I wanted to know from the person that was looking at his teeth and doing it"***

4.3.1.3.2 Information from others

A small number of those interviewed sought information from other people including relatives, friends and their family general medical practitioner (GMP). One of the parents received advice from her friend to take her child to hospital when the trauma happened. Another parent went to her GMP for further advice and was advised to visit the dentist instead, but no other information was provided. One parent also sought information from his uncle who was a dentist, who advised him to go to the EDH.

[P48: 510-512] ***"I took her to the GP... he didn't have no information on it, he didn't know but said I had to take her to the dentist"***

4.3.1.3.3 Remembering verbal information

Most of the parents wanted to have an extra source of information besides the verbal information received from their dentist. The majority suggested receiving an information leaflet at the end of their first appointment and some parents also suggested it maybe useful to be guided to an internet website. It was felt that providing them with this extra source of information would help them retain and understand the information received in such a stressful situation.

[P8: 143-145] ***"I guess my experience is I'm more concerned about his [child] welfare and the health of his tooth, quite difficult to take a lot of information in when you've got a child who's also very anxious about it"***

[P29: 176-177] ***"The easier way to remember them is to either have a website that people go to, to be able to look at for information, or to give them a piece of paper"***

In contrast, some parents thought that the information provided to them was sufficient and they did not feel the need for any additional information at that time point.

[P10: 196-197] ***“I don’t think we could have taken that much more information, we were trying to process everything that had happened”***

4.3.1.4 Written information

4.3.1.4.1 Information leaflet

The majority of the parents thought written information would be beneficial. Some reported that it would help them remember what they were told by the dentist and others said that it would be a reference for them in case they needed it for their child, or if they witnessed anyone else’s child experiencing a traumatic accident.

[P22: 219-220] ***“I guess I’ll get some knowledge if something happened to somebody, I can have idea how to do it, I’ll know the best things to do it”***

Parents were provided with the same example of an information leaflet which had been provided to their child, and were asked for their opinion regarding this leaflet. They thought the amount of information was just enough and they liked the question and answer format. The majority thought that a coloured leaflet would be better than having it in black and white print although one parent thought black and white print would be fine if the questions in the leaflet were clear and in bold style which would override the absence of colours.

[P53: 324-325] ***“Well it’s here in points, you know exactly what to do, that sort of thing. It’s got the information, phone numbers...it’s got all the information neat and simple”***

All of the parents wanted to see pictures on the leaflet. The majority preferred clinical photographs rather than cartoon pictures. Some thought it would be helpful to include pictures of possible signs and symptoms associated with the traumatised teeth and others wanted to see before and after treatment clinical photographs. One parent suggested having a mixture of photographs and clip art to make it appropriate to all age groups, as younger children may prefer cartoon type images to clinical photographs.

[P5: 140-142] ***“You want to know what the signs of something happening are. So I suppose pictures showing, for instance, teeth discolouring might be helpful”***

Regarding the information they wanted to see in the information leaflet, one parent wanted to have a list of what their child should and should not do. Another parent

thought it should include advice on the after care of the traumatised teeth including management of pain, oral hygiene procedures etc.

[P29: 302-305] ***“What the risks are, what you can expect to happen, what telephone numbers you need to call, what websites you might need to look at, how long a course of treatment is likely to take, the bleaching of teeth if they go black, it’s available, just general information about those sort of things”***

Other parents suggested including the expected course and length of treatment and the possible outcomes of the traumatised teeth. One parent also suggested including contact details in case of emergencies.

[P7: 446-448] ***“The after care of what it, ...how many days there is in pain or you know, eating... And how long the treatment takes”***

One parent suggested having different information leaflets according to the type of the trauma, especially for those with more complicated treatment as this might reduces the anxiety of children with less severe types of trauma.

[P8: 293-296] ***“I would think you’d probably want more than one type of leaflet because someone who has a serious mouth trauma ... If you’d handed him a leaflet with lots of really scary pictures in it at 8 years old, or even his parents who are anxious, I think that might be something which would increase anxiety rather than reduce it”***

Two parents said that they did not think that they would read the leaflet as it did not look attractive.

[P48: 320-323]: ***“The colours are not very lively... I wouldn’t pick up a leaflet like that to read it... probably the writing because it’s the first page should be letter with much bigger, yeah, more bold”***

One parent thought that information leaflets would not add any further information and thought it would not be practical to develop a leaflet as trauma is not common.

[P22: 179-180] ***“This happen to very few people, and so I don’t possibly think you must have a leaflet for that one”***

4.3.1.4.2 Other forms of written information

Several parents mentioned that there were no books available for parents regarding what to do in cases of dental trauma and felt that they would read them if they came across one.

[P48: 452-458] ***“I don’t think I will find any information in the library about that,...you find some books when they’re babies and how to take care, how to brush your teeth and things like that but I don’t think you’ll find any book in... dental trauma... would read it if available”***

One parent also thought that giving patients and parents a booklet would be helpful in providing them with more detailed information about different types of trauma, the available treatment options and the common outcomes.

[P36: 1118-1123] ***“It explained what each treatment does... quick explanation, ... and tell them reasons why you should visit a dentist, long term,... if you put all that and made it appealing you’d probably get people, a lot more people going to the dentist as well”***

A small number said that they would like to receive a written information in the form of a follow-up letter to summarise the issues discussed during their child’s appointment. They thought it would be useful to summarise of what had happened to the tooth, and important aftercare advice.

[P10: 206-212] ***“I think follow-up letters are good with ... important information such as what has happened and things that we needed to do to follow-up such as... Follow-up information, maybe about eating habits”***

4.3.1.5 **World Wide Web**

The majority of parents used the internet in their everyday life and most used Google™ search engine to look for information. However, few parents had looked for information regarding dental trauma on the internet. One of the parents mentioned that she did not look on the internet because the information available usually portrayed the worst that could happen which might not be applicable to her child’s condition. The amount of information on the internet was also perceived to be too much, or misleading.

[P29: 207-208] ***“Because quite often on the internet it tells you the worst case scenario for everything, or you get case studies from people who’ve had a real traumatic experience”***

A small number had sought information from the internet but only after the trauma happened. They looked for more details about the treatment, particularly the short and long-term treatment options.

[P48: 41-43] ***“When my daughter broke her tooth...I’ve tried to look before I came to an appointment what kind of help I had out there, what kind of treatment was out there for her and yeah, I went to the internet”***

All of the parents reported that they would use the Google™ search engine if they looked for information about traumatised teeth. A range of search terms were provided by the parent’s summarised in Table 4-6.

[P10: 346-347] ***“I suppose I would do a search on dental, dental trauma, nerve, tooth nerve damage, caring of young teeth, care of new adult teeth”***

Parent ID	Search term(s)
5	Trauma, teeth trauma
7	Dental injuries, dental injury and dental pain
8	Wouldn’t use trauma, broken tooth, Accident, tooth accident, teeth, tooth, teeth accident, dentist, emergency dentists
10	Dental, dental trauma, nerve, tooth nerve damage, caring of young teeth, care of new adult teeth
15	Root canal treatment
22	Tooth problems or toothache, mouth
29	Abscess
36	Dentist, Treatment, dental treatment, missing teeth trauma, missing teeth options
48	Dental problems with children, crown for children, implant for children
53	Move teeth, damaged teeth, damaged

Table 4-6 Summary of the search terms parents would use to look for information on the internet

When the parents were asked how they would assess reliability of the websites, some parents said that they would take information only from websites that link to the

NHS page, government websites or pages of well-known national and international dental associations, and that they would avoid visiting private dentists' pages.

[P7: 518-520] ***"I would go for one that I can see is actually directly linked properly to the NHS rather than some dentist trying to flog... So I would want something that would be dot.gov"***

Others would pick the first website on the list from the search results or would check the first two or three website and then choose what they thought was more accurate.

[P53: 55] ***"I pick the first one, I usually go by the first one"***

One parent suggested a dental trauma forum or mailing list to discuss patients' experiences following trauma.

[P48: 484-486] ***"Should do a forum because I think this is something that a lot of people go through with it so be like very... How am I going to say? Very interested to know the experience people had in the past"***

4.3.1.6 Other sources

4.3.1.6.1 Video

Only one parent expressed an interest in watching an online video giving information regarding trauma.

[P48: 580-582] ***"I think that video should contain ... things that we have to do after the person break her tooth... the steps what you have to do"***

4.3.1.6.2 Media

Some parents thought information from the media could be useful but others disagreed. However, they all agreed that the media does not currently include any information about dental trauma. One parent thought that children's show or TV adverts could include important steps regarding what to do if trauma happened.

[P48: 463-464] ***"Yeah, I'm always reading magazines and newspaper, I never came across no information about dental problems"***

In contrast, another parent thought education from television advertisements would not be very helpful and felt that people tend not to take advice from television.

[P53: 464] ***“I mean you see that one on TV about people lose, putting on too much weight and I don’t know, is that actually helping? I don’t think so”***

Only one parent said that he would listen to advice provided by a trusted authority such as a well-known NHS hospital in a radio programme.

[P10: 366-368] ***“I use BBC Radio, Radio 4 or local radio for me to know ... I would trust information coming through that source more than I would trust it from the internet”***

4.3.1.6.3 Electronic resources

The majority of the parents liked the idea of having a smartphone “App” about trauma. One parent suggested incorporating the important information regarding dental trauma in a general dental App as they felt no-one would download an application specifically about dental trauma if they had not experienced it themselves. Other parents suggested including dental trauma in a general Trauma App, which could include information about what to do if trauma happened to different parts of the body.

[P10: 439-444] ***“It’s a tricky thing because you don’t want to go round thinking oh the disasters that can befall you in one day... but if it can be incorporated into something of useful tips which maybe there are other web apps that can go along I’m sure they could come through”***

4.3.1.7 Trauma information seeking behaviour

The most preferred method for receiving information was the verbal information from the dentist, followed by the written information in the form of information leaflets and booklets then the internet (Table 4-7).

Parent ID	Preferred method
1	Leaflet
5	Dentist
10	Word of mouth from someone trustworthy
15	Dentist
22	Dentist
29	Internet
36	Booklet
48	Internet
53	Dentist

Table 4-7 Parents most preferred source of information

Some of the parents wanted to receive the information in stages as treatment progressed, but others wanted to know all the information right in the beginning with more details about the procedures as the treatment go.

[P53: 259-268] ***"I prefer to know all the stages that we're going through"... "I think the way they're doing it now is great because every day I come in they explain to me exactly what they're going to do and what they're going to do today and then they say, and they need another appointment ... to do whatever"***

4.3.1.8 Raising the public awareness regarding trauma

The majority of parents thought it is important to educate the public on how to prevent trauma, and raise public awareness regarding what to do if trauma happened. Only one parent thought that this information would not be relevant for anyone until they actually experienced trauma.

[P8: 318-319] ***"It's very difficult because people do need so many different ways. And actually these things aren't really important to people until they happen"***

A wide spectrum of information sources were suggested by the parents to increase public awareness. Some parents thought this information should be provided by dentists at check-up appointments or during school visits, or by having information leaflet or videos to educate patients whilst waiting for their dental appointment.

[P15: 98-105] ***"You could have dentists talk about it [during general check-ups]... in terms of advice that they give, you know, look after your teeth, brush twice a day, floss, mouthwash, and if you ever have an accident remember always to keep the piece"***

A small number of the parents felt that this information could also be provided by the GMP as people might seek their help following trauma. Some parents also suggested distributing information leaflets in the waiting areas of dental clinics and hospitals. These leaflets could also be sent across the NHS by post, together with the letter sent to patients by their GPs.

[P48: 510-512] ***"I think you should give information to the GPs because I remember when my daughter broke her tooth and she had a headache the next day, I took her to the GP and GP said to me, he didn't have no information on it"***

Some parents suggested educating sports teachers or personnel about basic preventive methods and what to do if trauma happened. In addition, to raise the awareness of children and encourage them to wear the sportguard.

[P15: 224-225] ***“You could teach and you could also contact the sports bodies themselves to make sure that their trainers and their coaches encourage the players to all use mouth guards”***

Parents also suggested distributing information leaflets or parents, in places where trauma occurs most often, such as sports clubs, schools or even in subways or tube stations.

[P36: 835-837] ***“The only way you’d get any information from the NHS across is if you put this, a small booklet inside schools and inside actual dentists where you walk in, where they’re sitting in the waiting room and they’re waiting and they can read the leaflet”***

[P53: 527-530] ***“Posters ...around say the subway and tube and all that. These sort of things... you pass them by every day and sometimes you’re just ... read them. Or even in a dentist place”***

The internet was reported to be a good source of information due to its easy access and availability, especially with smartphones. However, some parents thought that no one would look for information regarding trauma unless it actually happened to them or their child.

[P5: 193-194] ***“The trouble is I’m not sure people look on the website in advance. They only look on the website after it’s happened”***

Public campaigns aiming at educating children regarding trauma was the method most commonly suggested by the parents. This could be achieved by school education campaigns, where dentists provide children with the information, discuss experiences and answer questions. Dentists could then provide children with leaflets to take away with them or leave posters at the school. One parent also suggested approaching children in sports areas or parks and arranging education sessions with them.

[P7: 94-98] ***“Have a campaign that is possibly showing “these are the injuries that have happened to people” and...maybe show I suppose pictures or ...this person... before and after shots are usually quite impactful so that they start***

thinking about their safety because in this sport in particular they don't think about the safety"

One parent suggested that this information could be incorporated into the teaching curriculum or could be a theme for information provision during school assembly.

[P15: 107-108] ***"Child dental education in schools and things like that, I'm sure it could be added to the wealth of information that's given"***

Advertising campaigns were recommended by several parents, including the use of television, radio, newspapers or magazines. They thought it would be helpful to send the most important messages to the public on prevention and immediate action.

[P10: 390-392] ***"I think if you can make people aware of it such as simple stuff, such as, you know, we were saying about the tooth and the milk"***

However, some parents recognised that trauma is complicated and that including information in advertisements might be difficult and they thought it would probably not be cost effective.

[P49: 559-561] ***"You can put on TV, okay, because a lot of people watch TV but then trauma is a big thing, it's not something they're going to be able to explain straightaway"***

One parent suggested an NHS direct line for trauma queries to advise parents what to do if trauma happened and to advise them on how to deal with the emergencies and symptoms associated with traumatised teeth.

[P7: 538-555] ***"I think would be good to have is a dental emergency number... if there was an NHS...Trauma or dental trauma direct because they're going to be out-of-hours, if you go to the hospital they can't help you"***

4.4 Differences between patients and parents interviews

Ten paired patient/parents participated in this phase of the study.

4.4.1 Framework analysis

The frameworks extracted from the thematic analysis of patients and parents interviews were almost the same with slight differences in the subthemes. Parents interviews provided more subthemes and more details compared to the patients's ones.

4.4.2 Information needs

Information needs varied between patients and their parents. Initially, parents and patients preferred to receive similar information on average, but when a comparison was done between each patient-parent pair, only 2 pairs had similar concerns which were regarding the possibilities of losing the damaged teeth and experiencing pain.

During treatment, both patients and parents were concerned regarding aesthetic, having orthodontic treatment on traumatised teeth and possibility of root canal treatment. Only 2 patient-parent pairs showed similar concerns during the treatment, which included the possibility of losing tooth vitality and consequences of losing the filling.

Parents only expressed concerns on the long-term.

Regarding preferred way of receiving information, patients preferred to receive information in stages, as they felt in shock in the first appointment and unable to absorb the information. Then they preferred to receive more details in the follow-up appointments. Parents on the other hand had two views, some wanted to receive information on stages just like their children and others wanted to receive all information at once in the first visit. Only one pair provided answer for this question and both preferred different method where the child wanted information in stages while the parent all at once.

4.4.3 Information seeking behaviour

The majority of patients did not seek extra information and those who sought information varied in age. Younger children sought information from their parents

while older ones used more sources such as the internet and looked for more detailed information. In comparison, the majority of parents sought for extra information. Those parents used different sources and looked for more detailed information compared to their children. Only one child looked in the internet to look for information regarding trauma but his parent did not feel the need to do so.

4.4.4 Preferred method of receiving information

On average, patients and parents preferred different information sources of information as shown in

Table 4-8.

Patients	Parents
1. Written information 2. Verbal information <ul style="list-style-type: none"> • Dentist • Parents 3. Media 4. Internet	1. Verbal information from dentist 2. Written information (leaflet and booklet) 3. Internet

Table 4-8 Differences between patient and parents' information preference

ID	Patient	Parent
ID	Patient	Parent
10	Summary letter	Word of mouth
5	Leaflets	Dentist
15	Leaflet	Dentist
10	Summary letter	Word of mouth
22	Television	Dentist
15	Leaflet	Dentist
29	Dentist	Internet
22	Television	Dentist
48	My mum	Internet
29	Dentist	Internet
53	Internet	Dentist
48	My mum	Internet
53	Internet	Dentist

Agreement between each pair was assessed and none of the patient/parent pairs preferred the same method.

Table 4-9 Differences between patients and parents' preferred source of information

Chapter Five

Discussion- Phase I

5 Discussion of Phase 1

5.1 Discussion of methodology

5.1.1 Study cohort

The inclusion criteria for this study involved children aged 10 years and above and the ability to speak and write English. Children over 10 years of age have the required linguistic and cognitive skills to understand and interact with the interview questions in a similar way of adults. Younger age group (below 10 years), could have been included in the study but some changes would to the interview settings would be required such as the phrasing and the types of the questions to be asked. Charts, pictures, diagrams, videos or games might be used to assess the understanding of the younger groups while asking questions in the interviews. Therefore it seemed more convenient to include over 10 years old children to the study as changes required for the interview settings are minimum to those of adults. English was required to be mastered by participants as this is the main language used at the hospital and mastered by the research student conducting the interviews. It also eliminated the need of interpreter which could be time consuming and require pre-booking of an interpreter and probably special arrangement with the participants to book appointment for the interview with the presence of the interpreter. For this reason, the majority of participants were from British background rather than the other ethnic groups, which was considered a limitation of this study.

The children involved in this project ranged from 10-14 years, with a mean age of 11.6 years, which is similar to the reports regarding the average age for trauma occurrence (Gabris *et al.*, 2001). Patients at the initial emergency appointment were excluded, because they tend to be stressed and in shock after the trauma, and it would have been inappropriate to recruit them on that day. Otherwise, all patients at different treatment stages were invited to take part of this study together with their parents.

Fifty-four patients and parents were approached but only 10 patients and 11 parents agreed to take part in the study. Reasons for declining to participate varied, but included length of the treatment appointment and traveling issues. Most of the recruitment sessions were in the morning when children had to return to school, and sometimes the procedure took longer than anticipated and children were not

interested in doing the interview afterwards. Arrangements were made to overcome the time issue by asking patients in advance to either come earlier than the next appointment or to stay after the appointment to do the interviews and to do the parents interviews while their child have the treatment. The majority of those who declined the interviews in the first appointment also refused the second and some even at their third appointment. However, new themes stopped arising after interviewing 10 patients and 11 parents, therefore, a point of saturation had been reached.

All of the patients interviewed were mid treatment, which was expected due to the long-term follow-up and the complexity of treatment required following trauma. Seven males and 3 females were interviewed in this project, with a 2.3:1 ratio, which is consistent with the available literature regarding gender differences in trauma (Gabris *et al.*, 2001). Most of the children had experienced trauma either at school, at home or in play areas; and most occurred whilst playing or doing sports; which is also consistent with the available epidemiological studies (Gabris *et al.*, 2001).

All the recruited patients were accompanied by their parents; only one patient came with a foster parent who felt it would not be helpful to take part of the study because the trauma happened before she became the patient's carer.

5.1.2 In- depth interviews

Due to the lack of research available regarding information seeking behaviour after trauma; a qualitative approach was ideal to discover, explore and obtain a deeper understanding of the children and parents' opinions and information needs (Pope and Mays, 2006).

Interviews are the most commonly used method in qualitative research; and using semi-structured in-depth interviews ensured proper identification of the areas of interest (Stewart *et al.*, 2008). Interviews were used in this study rather the focus group because they allow confidentiality, which may increase the patients'/parent's confidence and allow them express what they feel and think is appropriate for them (Pope and Mays, 1995; Mays and Pope, 2000, Milena *et al.*, 2008). However, in-depth interviews require excellent interviewing skills to be able to probe important issues and deal with sensitive topics, and the researcher needed to be well trained for the interviews to avoid "leading" the participants and influencing their thoughts. Therefore the research student attended a course for in-depth interviews; and

performed several interviews with colleagues whilst being observed by the research supervisors. After conducting two formal interviews, the research team met to ensure that the interviews were meeting the required standard, especially for the children. Challenges faced while interviewing children included how to simplify the questions to make them easy to understand, and enable the respondents to answer in depth and breadth; in addition, the possible areas that need to be probed promptly. Therefore, additional training was provided at that stage to allow the important issues to be explored fully. Girls seemed to be more engaged with the interviews giving broader answers with simple questions, and boys on the other hand needed more probing to explore the areas of interest. Similarly, mothers seemed to be more interested in this study and gave broader and detailed answers and their interviews therefore lasted longer compared to fathers; possibly because in most cases mothers were the parent who dealt with the situation following their child's trauma.

The topic guides were developed by the research team to topics of interest to the research team. The questions were simple and in plain language so that the patients/parents were able to understand and answer accordingly. Most questions were open questions to allow freedom of thoughts. Probing questions were used as required by the interviewer to clarify and explore certain thoughts or new ideas.

When patients were recruited for the interviews, they were told that it was going to be a friendly chat and avoided the use of the term 'Interview' to make them more relaxed. Interviews took part in one of the side-surgeries, which provided a calm and quiet environment. There was no time limit for the interviews, and the interviews ended when the patients felt that they did not have anything else to say. Parents and patients were interviewed separately, and all but one patient did their interviews alone, without their parents' attendance. However, there was no interruption from the parent during their child interview (Patient 8).

5.2 Discussion of results

5.2.1 Patients information needs and information seeking behaviour

The patients' information needs were different immediately following the trauma and in follow-up appointments, and they wanted information to be provided in stages. Patients reported poorer information retention of information provided in their first appointment following trauma, which is consistent with studies reporting difficulties in

retaining information following stressful situations, and hearing worrying news about health and wellbeing (Cimprich, 1992; Shapiro *et al.*, 1992). Children reported that the dentist was explaining and talking to their parents rather than talking to them, which made them unable to follow and understand the information given to them. Insufficient dentist-patient communication which is associated with poorer information retention (Robinson, 2002). This communication difficulty mainly occurs as a result of three main factors; (I) failure of children to express their fear, (II) communication with children is mainly for information gathering, but they tend to be excluded from diagnostic and management information and (III) limitation of their ability to understand information provided (Lewis *et al.*, 1991).

Regarding the information need, initially patients wanted to be reassured and know specific information about the possibility to save and maintain the vitality of their teeth, and if it was going to cause them pain during treatment or function. Some were also worried if the procedure would be painful and if anesthesia would be used. These concerns were also reported by patients starting orthodontic treatment and surgical procedures (Smith and Callery, 2005; Buckley and Savage, 2010; Stephens *et al.*, 2013). This may be because they felt pain when they experienced the trauma and were anxious that this feeling may continue. In the following appointments, patients requested more detailed information regarding procedures to be done as the treatment continued. It has been suggested that providing patients with information regarding planned treatment is associated with reduced anxiety (Claar *et al.*, 2002).

The majority of children in this study did not seek extra information other than that provided by the dentist. This could mean that they were satisfied with the amount of information provided or avoided seeking information because they felt anxious to find worrying information or because they did not know where to find reliable information. In this study, information seeking varied according to age. Older children were more independent, and used sources such as the internet while younger patients (12 years and below) sought information from their parents. One child reported that his father had had a history of trauma, and offered a readily available source of information. Older patients mentioned that they would use various sources to look for information about their traumatised teeth, compared to younger patients who sought information verbally. Therefore, it is important to tailor sources of information differently for younger children. Seeking information could also be associated with the type of trauma, as children who suffered from more complicated types of trauma such as complicated crown fractures were the ones who sought information. None of the

interviewed children sought information prior to the trauma occurring, which indicates patients do not appear to seek dental trauma information until it affects them personally. There was no difference in the amount of information needed between males and females; but girls tended to look for information from wider range of sources.

The most preferred method chosen by children was written information in the form of a leaflet or summary letter. A leaflet was seen as an available source of information if they forgot the information provided by the dentist; however, some thought that information leaflets would be generalized, and would not necessarily contain the information they need. It could be helpful to have information leaflets for different types of trauma, to have more specific details and instructions for each one of them. Patients wanted the leaflet to be simple, 'eye catching', arranged in paragraphs and with bullet points. They also recommended different leaflets for different age groups with cartooned pictures for younger children and clinical pictures for older ones.

Interviewees also mentioned the dentist and their parents as preferred sources of verbal information with two patients preferring the dentist. This may be because children feel anxious while they are at the dentist, together with the shock of trauma, or because dentists use complex terminologies that they do not understand (Lewis *et al.*, 1991). It might also mean the lack of dentist patient rapport because the dentist's attention was focused on the parents, rather than the child.

Media also was a preferred source of information for one patient. This finding is consistent with a study undertaken in Finland, investigating the sources of dental health information, which found that the most common source of information used was television and radio (Murtomaa *et al.*, 1977). Another study concluded that the use of media influence positive changes or prevent negative changes related to health behaviour over a large population (Wakefield *et al.*, 2010).

The internet surprisingly was one of the least preferred method for seeking information amongst children. Although the majority of children used the internet regularly, only two children would use it as a source for information regarding their teeth. Older children preferred this method, probably because its accessibility; however, they would only use it only if they were confident about the reliability of the information and were anxious about finding worrying information. Therefore, providing the patient with a reliable link after the first appointment would be helpful to

direct patients to an internet source they can be confident about. Further details will be discussed in section 7.3.2.4.

5.2.2 Parents information need and information seeking behaviour towards dental trauma

Most parents wanted to receive information in stages, similar to their children, with only one parent wanted to receive all information at once in their first appointment with the dentist. This parent experienced trauma in her childhood and this history could be the reason for her to seek all the information at once to see what could happen to her child tooth compared to her tooth. Therefore, it is preferable to give the appropriate priority information in the first appointment and then to give specific information at follow up appointments (Luker *et al.*, 1996) unless requested otherwise.

Parents also expressed concerns at different stages of treatment, before and after treatment, but most of all regarding the long-term consequences. Parents were concerned initially about the wellbeing of their child especially those who experienced other symptoms such as headaches following the trauma. The long-term concerns included the cost of permanent treatment, and time required to finish the treatment and in adulthood. The cost of treating single tooth following trauma was estimated to be £856 in up to 10 visits in an average of 24 months. This cost was reported to be under-estimated as it included the hospital costs of each appointment and the estimated cost of parents' working days missed as result of attending the appointment with their children only. This cost did not include the travelling expenses, cost of medications, disturbances to home life or any other treatment in the long-term which might include re-treatment, crowns or even implants which will be associated with high costs (Wong and Kolokotsa, 2004). The issues regarding how trauma affected the children self-confidence was raised by parents which is consistent with the literature where injury to front teeth can cause significant emotional and social issues (Cortes *et al.*, 2002).

The majority of parents sought for information either before or after their child dental appointment, which was clarified by several reasons. Some parents were not satisfied with the information provided by the dentist or emergency services they saw prior to their appointment with the dentist at the EDH. Others mentioned that they received misleading information, which lead to frustration, and the need for a reliable source of information to give them answers. Some parents sought information immediately following their child's trauma, and prior to the visit to the dentist as they

had history of trauma themselves and wanted to see how would it affect their child. Those parents expressed more concerns in the short and long-term compared to other parents. They also used more than one source of information such as verbal information (relative, GMP), internet and books.

The parents most preferred source of information was verbal information from the dentist, who they considered as a reliable source, and enabled them to ask questions and receive information specific to their child condition. This was followed by written information and the internet.

When a comparison was done to see the agreement between children and their parents, none of the patient/parent pairs chose the same source of information, which highlights the importance of understanding the individual needs for patients and parents separately.

5.2.3 Sources of information

5.2.3.1 Verbal information

Patients preferred to speak with their dentist or parents, rather than talking to friends or relatives. It has been reported that 32.7% of children usually speak to their parents prior to hospital admission for surgeries (Gordon et al. (2010); and in this study, younger children (below 12 years) sought information from their parents. It might also show that children feels embarrassed to talk about their broken teeth with their friends unless they were also experienced trauma.

Parents also preferred to talk to the dentist regarding their child's teeth as they felt the dental professionals were the best person to answer their questions. Interestingly, one parent mentioned that she went to the family GMP for dental information, but they did not provide any information, and advised them to go to the dentist. Although the majority of parents received verbal information from their GDP or emergency dentist, but they felt unsatisfied with the information, and some parents did not receive information at all. Therefore, it is important to educate GDPs, emergency services and GMPs regarding emergency management, or ensure there is clear pathway and referral service for trauma patients to be referred to specialized service for management.

5.2.3.2 Written information

The majority of children and parents reported that they would like to have written information to support the verbal information given by their dentist. This approach has been widely used in healthcare and proved to be helpful in stressful situations (Leino-Kilpi *et al.*, 1993). Most patients and parents indicated that they could not recall all the information provided by the dentist and having a leaflet would be a useful reference. Thomson *et al.* (2001) investigated information retention of 3 sources of information: verbal, visual and written information; and found that the retention of written information was better. Patients and parents suggested having clear instructions and some clinical pictures regarding the possible outcomes regarding their traumatised teeth. Written information proved to be helpful in raising the patients confidence to manage their own health and proper adherence of instruction (Johnson *et al.*, 2003). Stephens *et al.* (2013) reported information leaflets as one the most popular resources for information regarding orthodontic treatment, because it was provided to them prior to their first appointment by post. This could be applied for trauma by providing the routine patients and parents with a leaflet containing general instructions and some information regarding the possible outcomes and what to do if they happened and advice can be provided to parents to encourage their children to read it. Additionally, these leaflets could be available at the dentist waiting area for everyone to pick, as trauma patients tend to come in emergency appointments. It is also important to consider the readability level and language used for children and parents to understand the leaflet, as a wide range of age groups would read the leaflet (Blinkhorn and Verity, 1979, Bekker *et al.*, 2010). One patient indicated that he prefer verbal information to written information because he would not understand them. It has been reported that patients and parents with lower literacy levels found difficulties in understanding information leaflet; therefore, leaflet might not necessarily benefit this group of patients (Stephens *et al.*, 2013) and even improving the literacy of the leaflet would not necessarily increase the patients' knowledge (Thomson *et al.*, 2001; Thickett and Newton, 2006). Age should be also considered when making these leaflets where different leaflets could be done for different age groups.

A summary letter was an interesting suggestion and it was first suggested by the same family (father and daughter) although they were interviewed separately. They though it would be helpful to have a summary of the clinical findings with specific

instructions and advice, as it would be written specifically to the patient condition. Further details regarding summary letter will be discussed in section 7.3.2.3.

A small number of patients and parents reported that they used library books for information regarding traumatised teeth, especially those who like to read in their free time. It has been reported that parents tend to borrow library books before their child's appointment, however, there is no available books written for patients or parents regarding dental trauma. It could be by leaving copies of information leaflet or booklet available in the library if they sought information there or to make a book for patients and parents regarding dental trauma.

5.2.3.3 Internet

The majority of children used the internet in their everyday mainly for socialising and homework which is expected as they grew up with readily available internet access (Westerman *et al.*, 2008). However, not many of them used it to look for information regarding their general health or traumatised teeth. Older children used the internet for health related issues, which is consistent with previous reports (Rice, 2006). Most of the parents also used the internet in their everyday life due to its wide availability at homes, work and public places which can be accessed even using smart phones. Parents used the internet to look for health issues more than their children.

Three parents used the internet to look for information following their child's trauma. One parent was anxious about being informed by insurance company websites.

The majority of patients and parents mentioned they would use Google as a searching engine rather than looking in medical websites directly, which is similar to previous reports (Stephens *et al.*, 2013; Fox and Rainie, 2002; Rice, 2006). However, some parents used NHS or NHS Direct websites to look for information. There are two websites for well-known organizations offers information for patients; the NHS and International association for Dental traumatology. These websites do not rank highly even with the use of the term 'dental trauma' or the terms provided by the patients. None of the patients nor the parents knew the scientific terminology for the type of trauma they had, therefore, access to a more reliable websites would be difficult because the ranking of those websites would be high only if they used scientific terminologies (Stephens *et al.*, 2013). Further details would be provided in section 7.3.2.4.

5.2.3.4 Other sources

Combining visual information with verbal information has been reported to improve information retention (Alsada *et al*, 2005). The majority of patients felt anxious about watching a video showing trauma but they showed positive attitude toward videos that showed them what to do if trauma happened. Children mainly watched videos in YouTube, this can be used as a route for delivering reliable information for children and adolescents. Parents were not very interested in watching a video regarding dental trauma.

Media including TV, radios newspapers and magazine seems to be an interesting source for information. Children and parents reported positive attitude towards watching a TV programme or magazine article about dental trauma. However, they pointed out that people would probably also do so if they had previously experienced trauma. It might be helpful to place an information leaflet with magazines or newspapers as a reliable source for information and readers can keep it as a reference when required.

Some parents and one patient showed positive attitude towards downloading a smartphone application. There is an available application developed by IADT, which contain first aid information for patients, but its efficacy has not been investigated for patients and parents.

In summary, there was no single standardised method for information provision preferred by patients and parents' following in-depth interviews. The next part of the study was to investigate the ISB needs of a larger cohort of dental trauma patients and their parents.

Chapter Six

Results- Phase II

6 Results of Phase II: Questionnaires

6.1 Pilot questionnaires

6.1.1 Developing questionnaire

The readability of patients and parent questionnaires was evaluated using the Flesch software package via Microsoft Word®. The patient questionnaire scored 67 and the parent questionnaire scored 69.6, both of which were within the recommended range between 60-70 for text to be easily understood (Flesch, 1948). The Flesch Kincaid grade level™ for the patient questionnaire was 6th grade, which corresponds to the reading ability of an 11 year old child. The parent questionnaire had a grade level of 5.9, which also corresponded to the reading ability of an 11 year old. This was considered acceptable for the study (Flesch, 1948). All participants, except 2 parents and 1 patient, were able to understand the information leaflet and the questionnaires. Those who could not understand the leaflets and questionnaires were excluded from the research as translators were not readily available.

6.1.2 Piloting questionnaires

Patients and parents questionnaires were provided to 13 patients and parents and they were asked if they would make any changes to the questionnaires and to add report their comments in the relevant areas. After completion of the questionnaires they were also asked verbally by the researcher (NB) about the clarity of the questions and if they had any further comments. All reasonable suggestions were incorporated in the final questionnaires.

6.1.3 Suggestions for amendments to the questionnaires

6.1.3.1 Patient questionnaires

6.1.3.1.1 Responses to question: Which of the following did you want to know at the time when your tooth/teeth were damaged?

One participant made a comment adding one extra response to the existing list including:

“Can the tooth be fixed“

6.1.3.1.2 Responses to question: Which of the following did you want to know after you had started treatment?

One patient felt that the response “If the filling would fall off” was not clear. Therefore, it was replaced with:

“If the filling/ cap my dentist placed would fall off”

6.1.3.1.3 Responses to question: If you use the internet, what do you usually use it for?

One patient added “Music” to the list of option. this was considered relevant and added to the responses.

6.1.3.1.4 Responses to question: Would you be interested in a phone application “APP” about damaged tooth/teeth?

One patient made an additional comment, which was thought to be relevant to other patients and was added to the options list:

“I might consider it if it involved games”

6.1.3.2 Parents questionnaires

6.1.3.2.1 Responses to question: Which of the following did you want to know at the time when your child’s tooth/teeth were damaged?

One parent made comment to this question, which was incorporated to the response list:

“The time frame in which treatment should happen”

6.1.3.2.2 Response to question: Which of the following would you like to know regarding the long-term outcomes of your child’s damaged tooth/teeth?

Several of parents made additional comments, including:

“Where should we go to have the rest of the treatment after my child is over 18 years old”

“How long the treatment would take approximately”

“How many appointments does my child need”

“How long each appointment would last”

“If my child would need to be reviewed following finishing the treatment”

The research team felt these were all to be valid and therefore, they were added to the existing response list.

6.1.3.2.3 Responses to question: Which of the following would you like to know regarding the long-term outcomes of your child’s damaged tooth/teeth?

One parent made an additional comment, which was also added to the list of options:

“If the final restorative treatment when my child is an adult will be time consuming”

6.1.3.2.4 Response to question: Sometimes we give patients and their parents written information about their dental treatment, which of the following do you think would be apply to you?

One of the parents made comment: “The leaflets would give me the chance to understand the information prior to my child’s dental visit”. The parent questioned why somebody would want a leaflet before a dental visit and how would they would actually obtain one.

Following discussion in the research team, this was replaced by two questions with relevant responses to each one of them:

Q8: Sometimes we give patients and their parents written information about their dental treatment, why do you think written information is important?

Q9: What do you think would be important to be included in written information leaflet?

This question was subsequently piloted and received further comments.

6.1.3.2.5 Responses to question: Sometimes we give patients and their parents written information about their dental treatment, why do you think written information is important?

One parent made a comment which was incorporated in the response list:

“Written information is useful for settling nerves when there is uncertainty “

6.1.3.2.6 Responses to question: If you use the Internet, what do you usually use it for?

Three parents added comments which included: Work, research and email and these were added to the response list.

6.1.3.2.7 Which website would you use/have you used to look for information about your child’s damaged tooth/teeth?

One parent added “None” which was thought to be valid as there were no negative responses on the list. It was therefore added to both patient and parent questionnaires.

6.1.3.2.8 How can we make other people aware of what to do if somebody damages their teeth?

One parents added a comment stating:

“To go to the dentist.. I do not believe in telling someone about something unless it actually happens”

Therefore, the following response was added:

“I do not think it is important to let anyone know unless it happens”

6.1.4 Time required to fill the pilot questionnaires

The average time required to complete the questionnaires was 12 minutes for patients (ranging from 10-15 minutes) and 15 minutes for parents (ranging from 17-20 minutes).

6.1.5 Final questionnaires

After the changes had been incorporated, the final questionnaire was approved and distributed to all trauma patients and parents who fulfilled the inclusion criteria in the time period from 19th March 2014 until 30th May 2014.

6.1.6 Questionnaire data analysis

Patients' and parents' responses to the questionnaires were transferred into SPSS® and Excel spreadsheets. Simple descriptive analyses were carried out for each question. The results will be presented in the following section in tables for each question, and responses are ordered according to the frequency of responses rather than their order in the questionnaires. Comparisons between groups (males and females) were undertaken using chi-square tests.

6.2 Demographic data

Eighty-five patients and parents were invited to take part of this study and complete the final version of the questionnaires, only 68 patients and 70 parents agreed to participate. The average age of patients was 13.13 years ranging from 10 to 17 years. The male to female ratio was 1.6:1 for patients and approximately 1:3 for parents. Of these who participated, 63 were "paired" children and their parents. All participants completed the questionnaires within the department (Table 6-1).

The tables in the result's sections show the numbers as a percentage of the total number of patients or parents (i.e. a percentage of 68 or 70 participants).

		Patients	Parents
Age		13.13 years (10-17)	N/A
Gender n= (%)	Male	42 (61.8%)	17 (24.3 %)
	Female	26 (38.2%)	53 (75.7%)
	Total	68	70
Average time since trauma		45 months (1-89 months)	

Table 6-1 Patients demographic data

6.3 Patient Questionnaires

6.3.1 Information need regarding dental trauma

When the patients were asked about the information they thought they would like to receive initially following trauma, as shown in Table 6-2 nearly all (92.6%) patients wanted to know the severity of the damage to their teeth. Possible outcomes (75.0%) and treatment (72.1%) were the next most common concerns. Around half of the patients wanted to know details regarding what had happened to their teeth (58.8%), the likelihood of saving the teeth (55.9%), if there would be pain associated with treatment (52.9%) or in the future (50.0%). Some patients also wanted to know which teeth were damaged (48.5%) but a relatively small percentage of patients wanted to know if the nerve in the tooth would lose vitality (29.4%). There were no significance difference between males and females.

Q3: Which of the following did you want to know <u>at the time</u> when your tooth/teeth were damaged?			
	n (%)	n= gender specific	P-value
How bad the damage was	63 (92.6%)	M: 40	0.36
		F: 23	
What might happen to the teeth in the future	51 (75.0%)	M: 31	1.00
		F: 20	
If the tooth can be fixed	49 (72.1%)	M: 30	1.00
		F: 19	
What had actually happened to my teeth	40 (58.8%)	M: 18	0.91
		F: 10	
Would the dentist be able to save the teeth	38 (55.9%)	M: 25	0.60
		F: 13	
Would any treatment to the teeth be painful	36 (52.9%)	M: 20	0.38
		F: 16	
Would the teeth hurt in the future	34 (50.0%)	M: 20	0.80
		F: 14	
Which teeth were damaged	33 (48.5%)	M: 18	0.34
		F: 15	
If the nerve in the tooth/teeth would die	20 (29.4%)	M: 12	1.00
		F: 8	
Others	5 (7.4%)	M: 4	0.64

		F: 1	
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Table 6-2 Patients' responses to question 3

(NB: Total number of respondent was 68. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100).

A small number of patients (10.3%) gave other comments regarding their initial information need:

"How long I would be "toothless""

"Will I get fake teeth", "If I would have a fake tooth put in"

"How long will the process take?"

"If I could still have braces"

Patients were asked about the information they wanted to know after starting treatment. The main concern was whether they would be able to bite on their damaged tooth/teeth (60.3%) and if the colour of the tooth/teeth would change (57.4%). Around half of the patients wanted to know if they could still have orthodontic treatment (47.1%), if treating their damaged teeth would require local anaesthetic (45.6%), the likelihood that the restoration would come off (41.2%) and if the nerve in the damaged tooth/teeth would die/become non-vital (41.2%). Around a third the number of participants wanted to know if they could brush their damaged teeth (39.7%) and if they would experience bleeding of the gum when brushing (32.4%) (Table 6-3). There were no gender differences.

Q4: Which of the following did you want to know <u>after</u> you had started treatment?			
	n (%)	n= gender specific	P-value
If you would be able to bite/chew with the damaged teeth	60.3% (41)	M: 23	0.36
		F: 18	
If the colour of the damaged teeth would change	57.4% (39)	M: 22	0.43
		F: 17	
If you could still have braces put on	47.1% (32)	M: 19	0.92
		F: 13	
If you would need any injections for future treatment on the teeth	45.6% (31)	M: 18	0.76
		F: 13	

If the filling would fall off (If the filling/ cap my dentist placed would fall off)	41.2% (28)	M: 12	0.01
		F: 16	
If the nerve in the damaged teeth would die	41.2% (28)	M: 18	0.89
		F: 10	
If you would be able to brush the damaged teeth	39.7% (27)	M: 17	1.00
		F: 10	
If the gum would bleed when you brush your teeth	32.4% (22)	M: 12	0.57
		F: 10	
Other	2.9% (2)	M: 2	0.51
		F: 0	

Table 6-3 Patients' responses to question 4

(NB: The total number of patients responding to this question was 65. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100)

Only two (2.9%) participants made extra comments regarding the information needed during treatment:

“How long the treatment will last”

“When do u get a crown”

6.3.2 Verbal information

The majority of children wanted to receive verbal information, with the exception of one patient (1.5%) who did not want to receive any verbal information about their damaged teeth. For those who wanted to receive information, the majority wanted to receive information from their dentist at the Eastman Dental Hospital (41.2%), followed by their own parents (20.6%). Most of patients who chose parents as their preferred source of information were younger than 13 years old (Table 6-4). A relatively small number of participants wanted to receive information from their own GDP (12%) and two patients wanted to receive information from their friend or from friend's parents (one patient selected each option) (Figure 6-1).

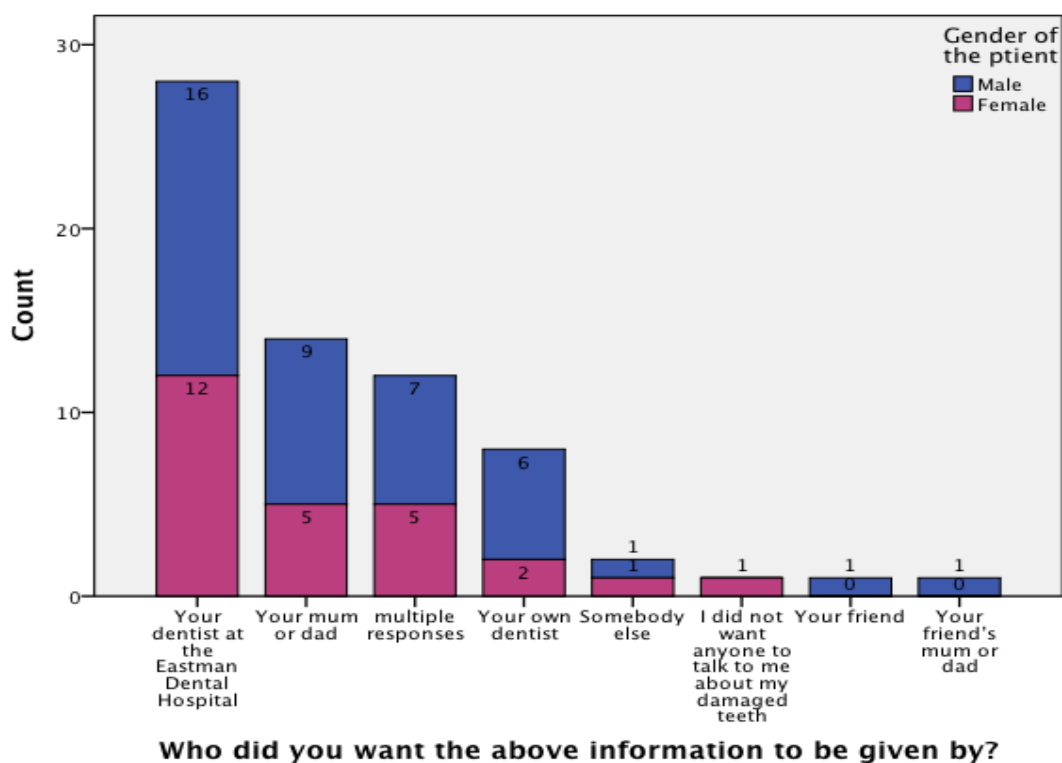


Figure 6-1 Patients' responses to question 5

(NB: The total number of respondent for this question was 67. Twelve respondents ticked more than one option and one respondent did not respond to this question; therefore percentages do not add up to 100%).

Two patients chose the option “someone else” but in the comments they stated that they did not have a preference or had not really considered discussing such issues:

“I did not really think about it”

“I do not care who knows”

Seventeen percent of the patients ticked more than one box as shown in Table 6-5.

Patient age	Preferred method					
	Dentist at EDH	Own dentist	Parents	Friend	Friend's parents	Someone else
13 years and below	15	2	11	1	1	1
Over 13 years	13	6	3	0	0	1

Table 6-4 Patients' preferred methods of receiving information according to different age groups

Patient ID	Preferred method
1	Mum or dad, brother or sister, another relative, own dentist, friend
12	Mum or dad, brother or sister, another relative, own dentist, dentist at EDH
16, 31, 35, 51	Own dentist, dentist at EDH
19, 34	Mum or dad, own dentist, dentist at EDH
40	Mum or dad, dentist at EDH
41	Another relative, dentist at EDH
49	Mum or dad, own dentist

Table 6-5 Summary table for participants with multiple responses to question 5

6.3.3 Written information

Of the 66 respondents who answered this question, the most preferred method of written information was a summary letter from their dentist (38.2%), followed by information leaflets (25.0%) as shown in Figure 6-2. Interestingly, 11 patients (16.2%) said they did not want to read any form of written information, 8 of whom were over 13 years of age (Table 6-7). For patients who ticked more than one response to this question, details are shown in Table 6-6. Only one patient chose the “others” option but they then referred to verbal rather than written communication:

“A talk with my dentist is explaining any future plans and what will happen”

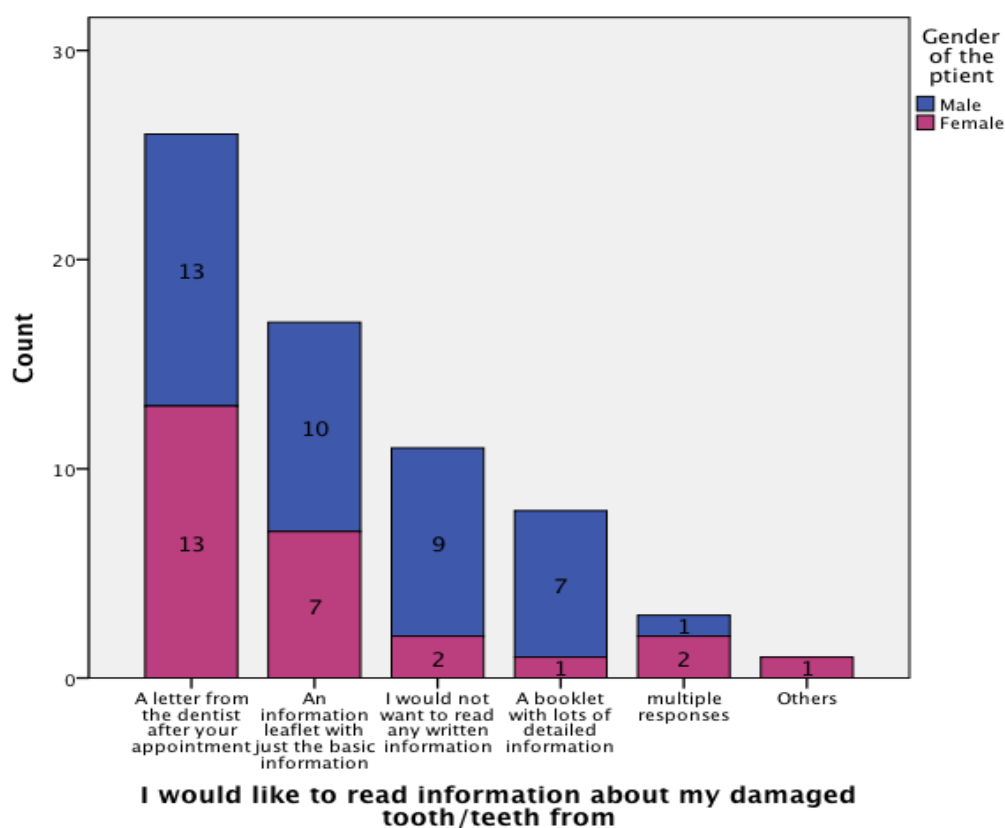


Figure 6-2 Patients' responses to question 6

(NB: The total number of respondents for this question was 66. Three respondents ticked more than one option and two respondents did not respond to this question; therefore percentages do not add up to 100%).

Patient ID	Preferred method
24	Information leaflet, booklet
34	Booklet, summary letter
41	Information leaflet, a booklet

Table 6-6 Details for patients who ticked more than one response for question 6

Patient age	Preferred method			
	Information leaflet	Booklet	Summary letter	Do not prefer written information
13 years and below (=n)	10	5	15	3
Over 13 years (=n)	7	3	11	8

Table 6-7 Preferred forms of written information according to age

Question 7 asked patients how they felt about written information and the majority thought information leaflets would help them remember what their dentist said. A fifth of patients (19.1%) said they would read it only if their parents read it though. However, a similar percentage (20.6%) the participants thought the information leaflets were boring, not eye catching and would not be useful because they would not be written specifically for them (Table 6-8).

Q7: Sometimes we give patients written information about their dental treatment, which of the following do you think are true about written information?	n (%)
I do not think written information/leaflets are eye catching usually	14 (20.6%)
It would remind me about what the dentist said	52 (76.5%)
Written information is generally quite boring	14 (20.6%)
Written information would not be useful as it would not be written specifically about my own teeth	14 (20.6%)
I would only read it if my mum or dad also read it	13 (19.1%)

Table 6-8 Patients' responses to question 7

(NB: The total number of patients responding to this question was 67. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100).

In question 8, patients were asked what they thought would be important to include in a leaflet and the most preferred option was photos of what might happen to the teeth (77.9%). Other responses included arranging the information in bullet points (47.1%), questions and answers (44.1%) and to include other patients' experiences (44.1%). Around a quarter of the participants wanted to see a combination of photographs and cartoon pictures (22.1%) or only cartoon pictures (16.2%) in the information leaflets (Table 6-9).

Q8: What do you think would be important to be included in written information leaflet?	n (%)
I would like to see photos of what might happen to the teeth	53 (77.9%)
I would like the written information to be arranged in bullet points	32 (47.1%)
I would like to have information given as questions and answers	30 (44.1%)
I would like it to include other patients' stories and experiences	30 (44.1%)
I would like to see a mix of photographs and cartoon pictures showing what might happen to the teeth	15 (22.1%)
I would like to see cartoon pictures of what might happen to the teeth	11 (16.2%)

Table 6-9 Patients' responses to question 8

(NB: The total number of patients responding to this question was 66. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100).

6.3.4 World Wide Web

Patients were asked how often they used the internet in their everyday life. Most of the participants said they used the internet everyday (64.7%), or a few times a week (20.6%). A small number of children said they do not use the internet at all (4.4%) (Figure 6-3). Respondents mostly used the internet to do their homework (67.6%), watch online videos (63.2%) and to play games (60.3%). Around half of the participants also used the internet for social networking (55.9%) and to play music (54.4%). Around a third of the patients used it for online shopping (36.8%) (Table 6-10). Five patients wrote comments on this question:

"Skype"

"YouTube"

"Research random things e.g. planet, earth"

"Looking at images for of animals"

"I do not use the internet"

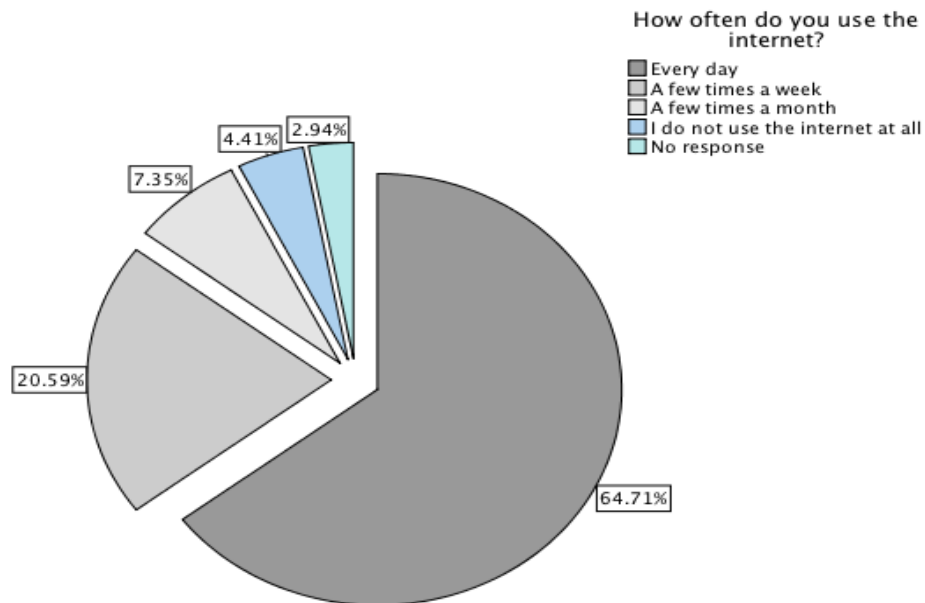


Figure 6-3 Patients' responses to question 9

(NB: The total number of patients responding to this question was 66; therefore percentages do not add up to 100%).

Q10: If you use the internet, what do you usually use it for?	n (%)
Homework	46 (67.6%)
Watching videos	43 (63.2%)
Games	41 (60.3%)
Facebook and social networking	38 (55.9%)
Music	37 (54.4%)
Online shopping	25 (36.8%)
Other	5 (7.4%)

Table 6-10 Patients' responses to question 10

(NB: The total number of patients responding to this question was 65. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100).

In question 11 patients were asked which websites they used/would use if they wanted to look for information regarding dental trauma and the most commonly

reported search engine was Google TM (82.4%). A third of the patients said they would use YouTube, followed by Wikipedia (19.1%) and Facebook (13.2%). Five patients added other comments including:

“NHS”

“Twitter”

“Specialist dental website/ NHS websites”

“I do not use the internet”

Question 12 asked what search terms patients would use to look for information about dental trauma on the internet (Table 6-11). The majority of children used terms such as “Broken teeth” or “Damaged teeth” and only a small number mentioned the term “trauma”. Not surprisingly, nobody mentioned the scientific name of the type of trauma they suffered (e.g. avulsion).

Q12: If you want to find information about damaged teeth on the internet, what words “search terms” would you use to search for this?
Damaged teeth, what would happen?
Broken tooth/teeth
Root canal
What is decay?
What can you do for a damaged tooth?
Damaged teeth
What happens to damaged teeth
Broken front teeth, treatment for missing teeth
Facts about damaged teeth
What happens to children with broken/damaged teeth?, what things can cause teeth to be damaged or broken
Broken front tooth
Damaged adult teeth
Now could damaged teeth be treated
Tooth treatment, tooth injury, tooth problems
Damaged teeth, treatment for damaged teeth

Broken tooth before and after information
Knocked out teeth
Chipped teeth
Front teeth
Trauma to teeth information
Broken tooth repair
Teeth trauma/ tooth damaged/ dead teeth
Chipped teeth
Broken teeth fix
Facts about damaged teeth
Healing time side effects
Damaged hurt
Www.damaged tooth and nerve damage.com
Root canal treatment, effects on teeth, types of treatment
What are the results for survival trauma to a front tooth?
What can happen to damaged teeth
Children's cracked teeth
Description of what had happened and of what state my tooth/ teeth was/were in?
What is root canal treatment?
Dental pain, problems with tooth

Table 6-11 Patients' responses to question 12

Question 13 asked the patients how they would check the reliability of information they found on the internet. The majority said they would check the first one or two websites that came up on their search (75.0%). Approximately one third of participants said they would look at one website and look for similarities in other websites and specified that they would avoid websites such as Wikipedia or WikiAnswer. Six patients made comments including:

"NHS, specialist answers, blogs ect."

"I would look at eye catching website names"

"Look for front teeth"

"Reliable websites"

"Who runs the website"

"I do not use the internet"

Note: Three patients did not respond to most of the questions in this part of the questionnaire as they were not internet users and some of the questions were not relevant to them.

Question 14 asked if patients had watched for videos about trauma online and only 16.2% said they had searched for information in this format. None of the patients had watched such a video before they had suffered dental trauma (Figure 6-4).

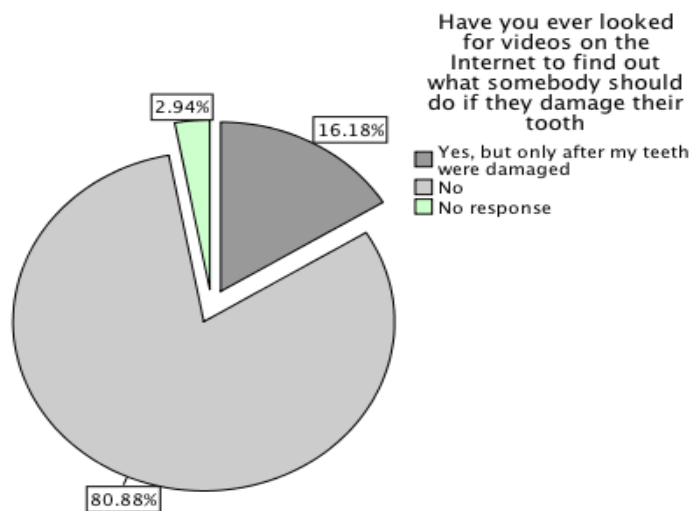


Figure 6-4 Patients response to question 14

(NB: The total number of patients responding to this question was 66. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100%).

In question 15, patients were asked about their thoughts on watching online videos. Fifty-five patients (44.1%) said they would not be interested in watching videos providing information about dental trauma, and 16 patients (23.5%) felt watching such videos would be scary. However, 25 patients (36.8%), said they would watch online videos explaining the possible treatment options and what could happen to the traumatised teeth, and 17 (25.0%) patients said they would watch videos rather than asking others about damaged teeth, and felt that videos would help them remember

information provided by their dentist (Table 6-12). One patient made an additional comment:

“I would prefer not to watch a video, off putting”

Q15: Regarding internet videos, please look at the following statements and tick those that apply to you.	n (%)
I would not want to watch videos about damaged teeth	39 (44.1%)
I would like to watch a video about the treatment options for the damaged teeth	25 (36.8%)
I would like to watch a video about what might happen to the damaged teeth	21 (30.9%)
I would prefer watching video about damaged teeth to get the information I need rather than asking other people.	17 (25.0%)
Watching a video about damaged teeth might be scary	16 (23.5%)
Watching a video following my dental appointments would help me remember what the dentist said about the damaged teeth	16 (23.5%)
Other	3 (4.4%)

Table 6-12 Patients' responses to question 15

(NB: The total number of patients responding to this question was 66. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100).

Question 17 asked patients if they would use smart phone applications “Apps” to look for information regarding trauma. Thirty-nine (44.1%) participants said they would not download Apps regarding dental trauma. Only 25 (36.8%) would download such an App if it included information about what could happen to damaged teeth and available treatment options or if it provided guidance for the immediate management following trauma (30.9%). Almost a fifth of patients (19.1%) mentioned they would use it only if it involved games (Table 6-13). Most of the patients who said they would not use Apps were in the younger age group (13 years or below) as shown in Table 6-14.

Q16: Would you be interested in a phone application “APP” about damaged tooth/teeth?	n (%)
No, I would not use an “app” about damaged teeth	39 (57.4%)
Yes, especially if it told me what might happen to the damaged teeth and the possible treatment options	19 (27.9%)
Yes, especially if it told me what to do if the teeth were damaged	18 (26.5%)
Yes, if it involved games	13 (19.1%)

Table 6-13 Patients' responses to question 16

(NB: The total number of patients responding to this question was 66. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100).

Patient age	Smart phone applications			
	Yes, if involve treatment options	Yes, if include emergency management following trauma	Yes, if included games	No
13 years and below (n=36)	8	8	8	24
Over 13 years (n=30)	11	10	5	15

Table 6-14 Smart phone application in different age groups

6.3.5 Media

When participants were asked about use of other forms of media in question 17, 36 (52.9%) said that would not read an article about damaged teeth. Thirty-eight percent said they would read such an article but only after they had experienced trauma and only 4 (5.9%) said they would be interested in reading an article about damaged teeth even before they had sustained their trauma.

6.3.6 Preferable source of information

Question 18 asked the most preferred method of receiving information, more than half of the patients selected verbal information by their dentist at EDH (55.9%), followed by written information in the form of summary letter (17.6%). The internet

was third (13.2%), followed by other media (4.4%) (Figure 6-5). Two respondents ticked two options; verbal and written information despite being asked to select only one option. One patient stated that they had no preferred option:

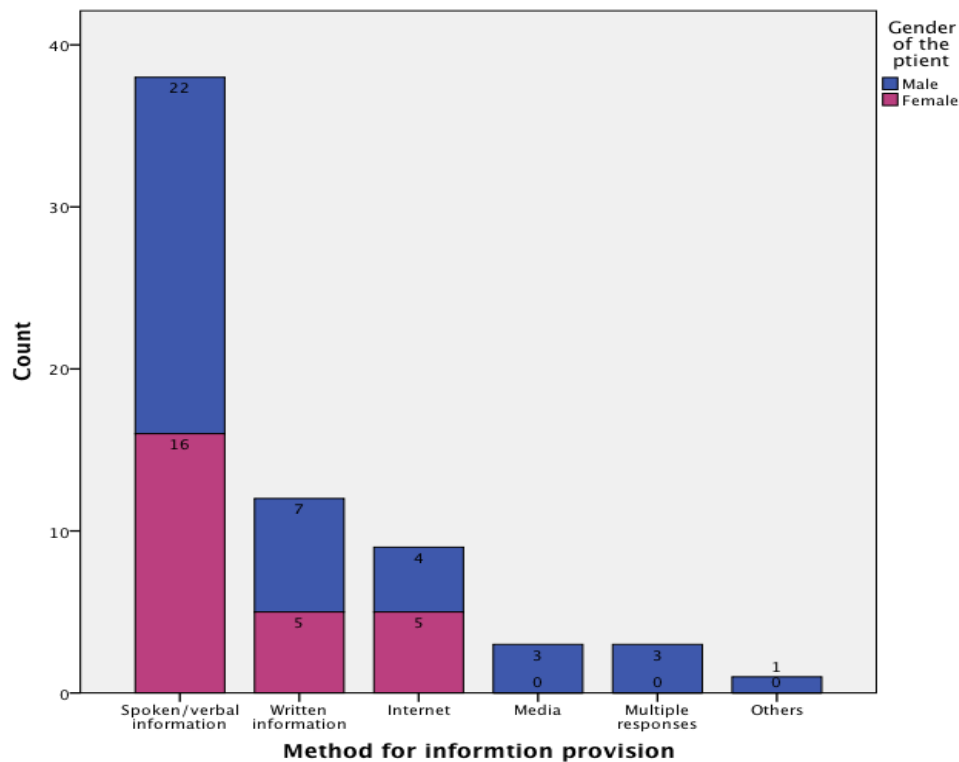


Figure 6-5 Patients' responses to question 18

(NB: Total number of respondents was 66, 2 respondent ticked more than one response; therefore percentages do not add up to 100%).

6.3.7 Raising public awareness

The majority of patients thought it was important to raise public awareness of dental trauma. Over the half of the participants thought dentists play a major role in public education, and felt this could be achieved by visiting schools (57.4%) or educating children at their regular dental check-ups (52.9%) and by providing information materials in dental waiting areas (51.5%). Just under the half of the respondents suggested making information available in GMP surgeries (45.6%) and hospital waiting areas (42.6%) or providing information via the media (41.2%). Around a third

of patients thought that educating school teachers and sport personnel (39.7%) was also important.

Publishing a newspaper/magazine article (32.4%) or broadcasting a video on the internet (32.4%) were also perceived as being helpful in raising awareness towards immediate management of trauma. Patients also selected options of placing posters in public places (27.9%) or sport areas (20.6%), publicity school campaigns (16.2%) or incorporating information as “after school club” topics (10.3%) (Table 6-15).

Q19: How can we make other people aware of what to do if somebody damages their teeth?	n (%)
I do not think it is important to let anyone know unless it happened to them	18 (26.5%)
Dentists should visit schools to explain to children what to do if a child damages their teeth	39 (57.4%)
Family dentist could explain what to do if the teeth were damaged when they see patients for regular check ups	36 (52.9%)
Information in dentists' waiting rooms (posters, information leaflets etc.)	35 (51.5%)
Information in Doctors' surgeries (posters, information leaflets etc.)	31 (45.6%)
Information in hospital waiting rooms (posters, information leaflets etc.)	29 (42.6%)
TV adverts and programmes	28 (41.2%)
By giving school teachers special training about what to do if a child damages their teeth	27 (39.7%)
By teaching those who run sport clubs what to do if a child damages their teeth	27 (39.7%)
A video on the internet showing people what to do if their tooth was damaged	22 (32.4%)
Magazine or newspaper articles	22 (32.4%)
Posters in public places (e.g. on public transport)	19 (27.9%)
Information in sports clubs (posters, information leaflets etc.)	16 (23.5%)
Posters in sports places (e.g. swimming pools)	14 (20.6%)
Publicity campaigns in schools	11 (16.2%)
Information given at after school clubs	7 (10.3%)

Table 6-15 Patients' responses to question 19

(NB: The total number of patients responding to this question was 66. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100).

Question 20 asked the patients to write any other comments they felt were relevant and not covered on the previous questions. Those comments are summarised in Table 6-16.

Patient ID	Comment
8	What will happen in the future?
16	Sometimes between operations it can hurt and it would be good to have one in one sessions with your hospital dentist
19	Thanks a lot!
24	Would my nerve ever grow
27	I personally think that information should be given more when having check ups, also explain how long you will be in the hospital for regarding their needs
38	How long it would take
43	Will I get an implant
46	An application about dental issues in general
51	Emergency dentist numbers
75	Will it be possible for it to make a full recovery?
79	Why has my damaged tooth gone this colour?
82	I am worried if I lose my teeth.

Table 6-16 Patients' responses to question 20

6.4 Parent questionnaires

6.4.1 Information need

Parents were asked about their initial concerns following dental trauma (Table 6-17), the majority of parents wanted to know what would happen to their child's tooth/teeth (91.4%), the severity of the trauma (85.7%), would the dentist be able to save their child's teeth (84.3%), the treatment options available to restore their child's tooth/teeth (81.4%), if the nerve of the damaged teeth would become non vital (74.3%) and where was the best place to obtain treatment (71.4%). Over the half of the parents also wanted to know the time required for treatment (60.0%), if the tooth would be painful in the future (58.6%), which teeth were affected by the trauma (55.7%) and if the dentist was able to reposition the tooth (51.4%). Just under the half wanted to be told what had happened to their child's tooth/teeth (48.6%), which hospital (44.3%) or dentist (41.4%) they should take their child to and if treating these teeth would be painful (42.9%).

Q3: Which of the following did you want to know <u>at the time</u> when your child's tooth/teeth were damaged?	n (%)
What might happen to the teeth in the future	64 (91.4%)
How bad the damage was	60 (85.7%)
Would the dentist be able to save the tooth/teeth	59 (84.3%)
What are the available options for treatment of my child's tooth/teeth	57 (81.4%)
If the nerve in the tooth/teeth would die	52 (74.3%)
Where was the best place to get treatment?	51 (71.4%)
The time frame in which treatment should happen	42 (60.0%)
Would the tooth/teeth hurt in the future	41 (58.6%)
Which teeth were actually damaged	39 (55.7%)
Would the dentist be able to reposition the tooth back to my child's mouth	36 (51.4%)
What had happened to the tooth/teeth	34 (48.6%)
Which hospital should I take my child to?	31 (44.3%)
Would any treatment to the teeth be painful	30 (42.9%)
Which dentist should I take my child to?	27 (41.4%)
Other	5 (7.1%)

Table 6-17 Parents' responses to question 3

(NB: The total number of parents responding to this question was 69. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100).

Five parents made comments on this question including:

“Where to go for emergency treatment when dentists are shut, my son had a terrible infection after the initial accident. We tried to find an emergency dentist and there was no NHS service available”

“Long term consequences, where and how to get referrals beyond my dentist to specialist”

Question 4 asked about concerns child’s treatment. As shown in Table 6-18, 82.9% of the respondents wanted to know if the traumatised tooth would discolour. Most of the parents also wanted to know the signs of loss of vitality (77.1%), if the tooth would become non-vital (75.7%), the possibilities of losing the tooth/teeth (74.3%), if their child would be able to bite on the traumatised tooth/teeth (70.0%) and the length of the treatment (67.1%). Around half of the respondents wanted to know if their child would experience pain from the traumatised teeth (58.6%), the number of appointments required to treat the tooth/teeth (57.1%), if the trauma would affect aesthetics (52.9), if the nerve in the traumatised tooth would continue “growing” (50.0%), if their child would still need to have follow-up reviews after commencing treatment (48.6%), if the treatment to the damaged tooth would be painful (47.1%), if the filling could come off (42.9%), if their child could still have orthodontic treatment (42.9%), the types of food their child could eat (41.4%) and if the trauma would affect their child’s self confidence (41.4%). Parents also wanted to know about the length of the appointments (38.6%), medication for pain relief (37.1%), if their child could play sports (35.7%), if they could brush the traumatised teeth (31.4%), if their child’s gums would bleed when brushing (24.3%) and if their child would need injections for future treatment (27.1%).

Three respondents made additional comments such as:

“How it might affect other teeth nearby”

“My child had root canal treatment and was told that afterward it probably would not hurt- but it did so much, so I needed advice - would have liked guidance on what to do if this happened before we left the hospital”

Q4: Which of the following did you want to know <u>after</u> your child had started treatment?	n (%)
If the colour of the damaged tooth/teeth would change	82.9% (58)
What signs we would see if the nerve in the damaged tooth/teeth died	77.1% (54)
If the nerve in the damaged tooth/teeth would die	75.7% (53)
If there is still a chance of losing the tooth/teeth	74.3% (52)
If my child would be able to bite/chew with the damaged teeth	70.0% (49)
How long the treatment would take approximately	67.1% (47)
If my child's damaged tooth/teeth would be painful	58.6% (41)
How many appointments will my child need	57.1% (40)
If the damaged tooth/teeth will affect how my child looks	52.9% (37)
If the root of the tooth would continue growing	50.0% (35)
If my child will need to be reviewed after treatment finishes	48.6% (34)
If the treatment to the damaged tooth/teeth would be painful	47.1% (33)
If the filling might fall out	42.9% (30)
If my child could still have braces put on	42.9% (30)
What types of food I should give to my child	41.4% (29)
If the damaged tooth/teeth will affect my child's self-confidence	41.4% (29)
How long each appointment will be	38.6% (27)
What medicine I should give my child to relieve the pain	37.1% (26)
If my child can still play sports	35.7% (25)
If my child would be able to brush the damaged tooth/teeth	31.4% (22)
If the damaged tooth/teeth has to have an abscess in order to start root canal treatment	30.0% (21)
If my child would need any injections for future treatment on the teeth	27.1% (19)
If the gum would bleed when my child brushes his/her teeth	24.3% (17)
If my child should stop eating sweets and fizzy drinks	22.9% (16)
Other	4.3% (3)

Table 6-18 Parents' responses to question 4

(NB: Total number of parents responding to this question was 70, respondents were asked to tick more than one option; therefore percentages do not add up to 100).

Question 5 asked what parents wanted to know regarding long-term outcomes (Table 6-19). The majority wanted to know the long-term prognosis of the teeth (87.1%) and the treatment options in adulthood (80.0%). Two thirds of parents wanted to know where to take their children for treatment when they become over 18 years of age (65.7%), the likely expenses involved in future treatment (64.3%) and if the trauma would have a significant effect on their child's self confidence (51.4%). More than half of the parents (51.4%) were concerned as to whether their child could still have orthodontic treatment. Parents also wanted to know whether their child could still play sports (32.9%) and if they would need to wear a mouthguard (42.9%).

Only one participant made a comment on this question:

"Will my child still require treatment after he is 18? He damaged adult teeth".

Q5: Which of the following would you like to know regarding <u>the long-term outcomes</u> of your child's damaged tooth/teeth?	n (%)
What is the long-term prognosis of the damaged tooth/teeth	61 (87.1%)
What are the options available to us to restore my child's broken tooth/teeth when they are older (over 18 years)	56 (80.0%)
Where should we go to have the rest of the treatment after my child is over 18 years old	46 (65.7%)
If the final restorative treatment when my child is an adult will be expensive	45 (64.3%)
If the appearance of the damaged tooth/teeth will affect my child's self-confidence	36 (51.4%)
If my child can still have braces put on	36 (51.4%)
If my child should wear a gum shield (sportguard) for sports	30 (42.9%)
If the final restorative treatment when my child is an adult will take a long time	28 (40.0%)
If my child can still play sports	23 (32.9%)
Other	2 (2.9%)

Table 6-19 Parents' responses to question 5

(NB: The total number of parents responding to this question was 69. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100).

6.4.2 Verbal information

Parents wanted to receive verbal information mainly from a dentist, either their child's dentist at EDH (41.4%) or their GDP (30.0%) (Figure 6-6). Two parents provided other comments including:

"Own dentist, or the person who discovered the damage"

"Any competent dentist"

Several parents ticked more than one response and most of these respondents wanted to receive information from their child's own dentist and dentist at EDH (Table 6-20).

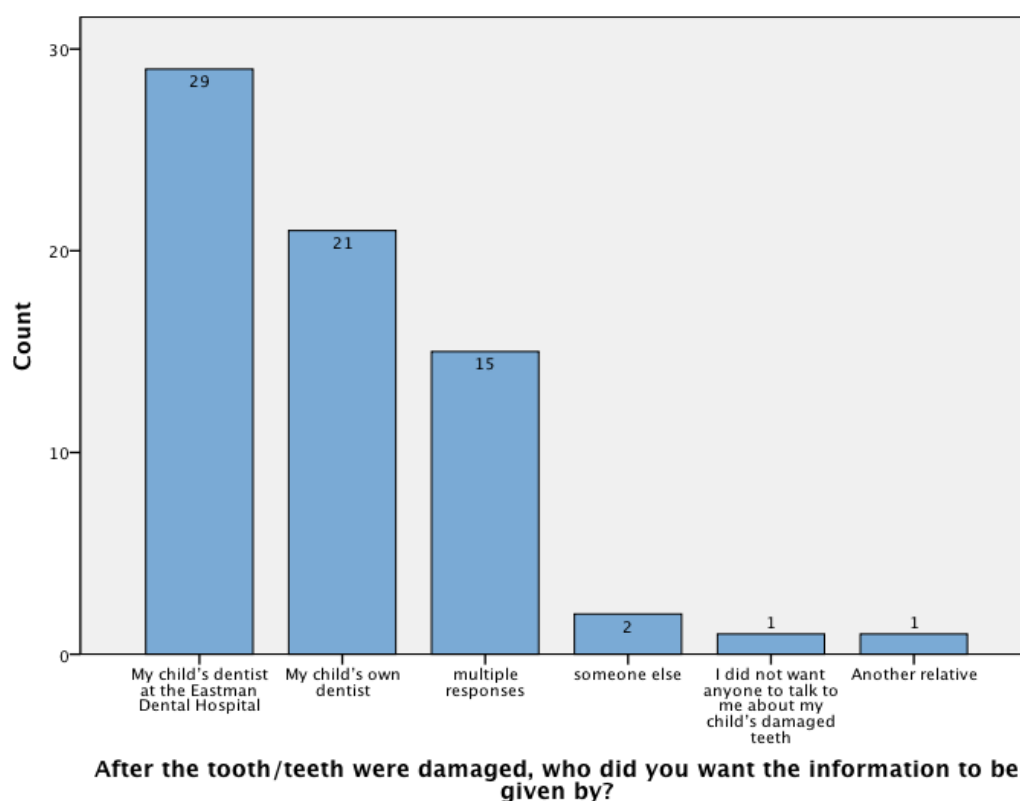


Figure 6-6 Parents' responses to question 6

(NB: The total number of parents responding to this question was 69. Respondents were allowed to tick one option, 15 ticked more than one option, therefore percentages do not add up to 100).

Parent ID	Preferred method
6, 17, 18, 20, 34, 42, 44, 50, 51	My child's own dentist, my child dentist at the EDH
10	My brother or sister, my friend, dentist at EDH
14, 26	My child own dentist, my child dentist at EDH, my child doctor
16	Own dentist, or the person who discovered the damage
24	Another relative, my child dentist at EDH, my child doctor
28	My friend, my child own dentist, my child dentist at EDH

Table 6-20 Summary table for the parents who ticked multiple responses to question 6

6.4.3 Written information

The most preferred source of written information was a summary letter (28.6%), followed by a detailed booklet (27.1%) and a basic information leaflet (15.7%). Small number of parents wanted to receive written information in the form of a book or a “Do’s and Don’ts” sheet (Figure 6-7). Details regarding parents who ticked more than one response are summarized in Table 6-7.

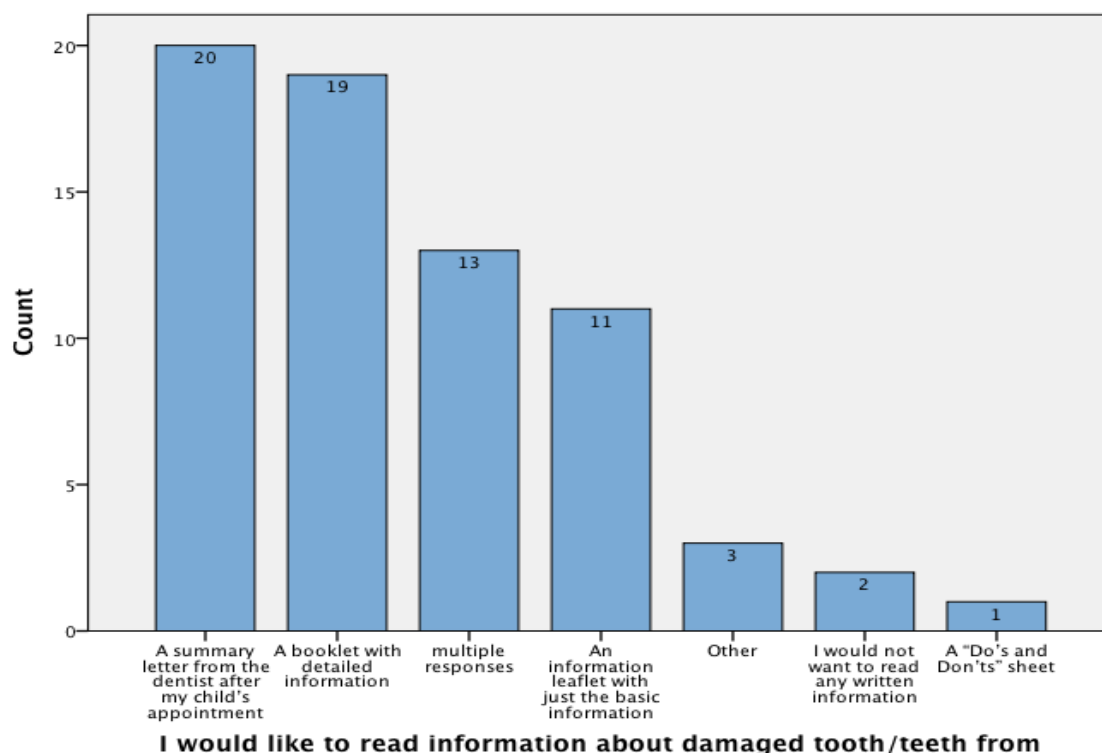


Figure 6-7 Parents' responses to question 7

(NB: The total number of parents responding to this question was 69. Although

respondents were to tick only one option, 13 ticked more than one option, therefore percentages do not add up to 100).

Parent ID	Preferred method
1	Information leaflet, summary letter, "Do's and Don'ts" sheet
12, 56	Summary letter, "Do's and Don'ts" sheet
14, 21, 26	Detailed booklet, summary letter
18	Information leaflet, summary letter, "Do's and Don'ts" sheet
20	Information leaflet, summary letter
24	Information leaflet, detailed booklet, "Do's and Don'ts" sheet
28	Information leaflet, detailed booklet, summary letter, "Do's and Don'ts" sheet
36	Detailed booklet, summary letter, "Do's and Don'ts" sheet

Table 6-21 Summary table for parents with multiple responses to question 7

Six parents made comments on this question:

"Need to ensure it is in a language which is easy to understand".

"General information is not as useful unless accompanied specific info".

"Detailed booklet, "Do's and Don'ts" sheet should be available on websites"

Question 8 asked parents about the perceived importance of written information. The majority of parents thought that providing them with written information would help them remember what they had been told during their dental visit (74.3%). Over sixty percent of parents also wanted to receive written information because they thought it would help them understand the information prior to their child's dental appointment (61.4%), reassure them (60.0%) and would tell them what to do if trauma happened to their child or someone else (48.6%) (Table 6-22).

Q8: Sometimes we give patients and their parents written information about their dental treatment, why do you think written information is important?	n (%)
It would remind me what the dentist said	52 (74.3%)
It would give me the chance to understand the information prior to my child's next dental visit	43 (61.4%)
It would help in reassuring me about my child's damaged tooth/teeth	42 (60.0%)
It would tell me what to do if my child, or anyone else, damaged their teeth in the future	34 (48.6 %)
Written information would not be useful as it would not be written specifically about my child's own teeth	13 (18.6%)
Other	2 (2.9%)

Table 6-22 Parents' responses to question 8

(NB: The total number of parents responding to this question was 65. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100).

Question 9 asked parents about the important information to be included in information leaflets (Table 6-23). The majority of parents wanted emergency contact numbers to be included (72.9%) and also some photographs of what could happen to the traumatised teeth (51.4%). Parents wanted the information to be arranged in the form of simple bullet points (57.1%) or in the form of questions and answers (50.0%). Half of the parents wanted to have different types of leaflets for different types of trauma. Parents also felt it would be useful to have leaflets available in schools and to include lists of nearby emergency dentists (45.7%). Some parents also felt it would be helpful to include other patients' experiences (30.0%), a blank space at the end for them to write comments or questions for the dentist (27.1%) and to include a combination of cartoon and clinical pictures (20.0%).

Q9: What do you think would be important to be included in written information leaflet?	n (%)
To include emergency contact numbers	51 (72.9%)
The written information to be arranged in bullet points	40 (57.1%)
Photographs of what might happen to the teeth	36 (51.4%)
To have information given as questions and answers	35 (50.0%)

Different written information sheets specific to the type of tooth/teeth damage my child had	35 (50.0%)
To be available at schools and have a list of the nearby emergency dentists	32 (45.7%)
To be sent with the appointment card for the first appointment	28 (40.0%)
To include other patients' stories and experiences	21 (30.0%)
To have an empty space at the back of the leaflet to write any questions or comments for the dentist	19 (27.1%)
A mix of photographs and cartoon pictures can be included showing what might happen to the teeth	14 (20.0%)
To be printed in colour	13 (18.6%)
A picture of a damaged teeth on the front page	11 (15.7%)
Cartoon pictures of what might happen to the teeth	8 (11.4%)
Other	2 (2.9%)

Table 6-23 Parents' responses to question 9

(NB: The total number of parents responding to this question was 69. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100).

Two parents wrote comments on this question:

“For all dentists to have these information leaflets to offer patients straight away”

“To include information on damage to adult teeth in children”.

6.4.4 World Wide Web

The majority of parents said they used the internet everyday (78.6%) or a few times a week (11.4%); only 2.9 % did not use the internet (Figure 6-8). Most of the parents used the internet for emails (81.4%), online shopping (65.7%), work purposes (58.6%) and to do research (58.6%). Around the half used the internet for social networking and Facebook (55.7%), looking for health related information (51.4%) and checking the news (50.0%) (Table 6-24). Two parents added “games and “studying”.

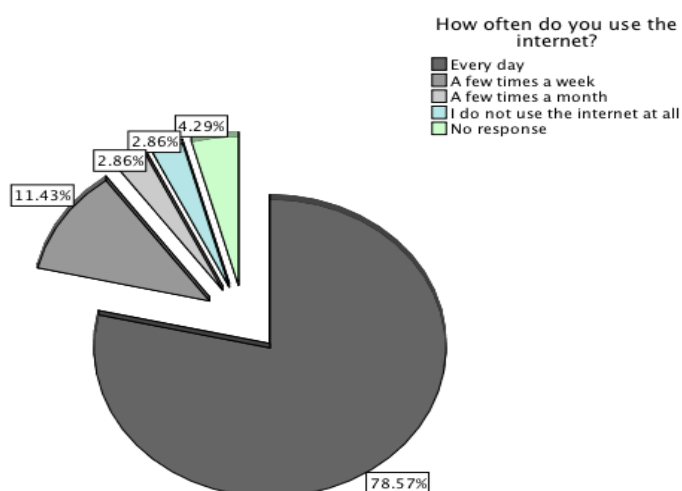


Figure 6-8 Parents' responses to question 10

(NB: The total number of parents responding to this question was 67, therefore percentages do not add up to 100).

Q11: If you use the internet, what do you usually use it for?	n (%)
Email	57 (81.4%)
Online shopping	46 (65.7%)
Work	41 (58.6%)
Research	41 (58.6%)
Facebook and social networking	39 (55.7%)
Looking for health-related information	36 (51.4%)
Checking the news	35 (50.0%)
Others	3 (5.7%)

Table 6-24 Parents' responses to question 11

(NB: The total number of parents responding to this question was 67. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100).

The most popular search engine the parents would use to look for information regarding dental trauma was Google (84.3%), followed by NHS websites or NHS Direct (51.4%). Parents also said they would use dental related forums (15.7%), YouTube (14.3%), Facebook (11.4%), Wikipedia (10.0%), mailing groups (4.3%) or

the Boots website (1.4%) (Table 6-25). One parent mentioned that they would use other search engine such as “Bing”.

Details regarding the terms that parents would use to look for information regarding dental trauma are summarized in Table 6-26.

Q12: Which website would you use/have you used to look for information about your child's damaged tooth/teeth?	n (%)
Google	59 (84.3%)
NHS website/NHS direct	36 (51.4%)
Forums (e.g. teeth related forums)	11 (15.7%)
YouTube	10 (14.3%)
Facebook	8 (11.4%)
None	7 (10.0%)
Wikipedia	7 (10.0%)
Mailing group for information regarding damaged teeth	3 (4.3%)
Other	2 (2.9%)
Boots website	1 (1.4%)

Table 6-25 Parents' responses to question 12

(NB: The total number of parents responding to this question was 66. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100).

Q13: Which words or “search terms” would you use to search for information about damaged teeth?
Damaged or broken teeth
Broken tooth/teeth
Abscess tooth, injured teeth children, root canal
Damage to teeth
Trauma to teeth, care for damaged teeth
Children, compacted teeth, I would ask the dentist the name of the condition then Google that including children.
Teeth trauma

Playground accidents, damaged tooth, broken front tooth
Teeth trauma, broken tooth, damaged tooth
Dental treatment for children, damaged teeth children.
NHS or NHS direct
Dental treatments, research available on teeth injuries, dental problems
Trauma to tooth, tooth pushed back into gum, damaged nerve in tooth
Tooth damage by accident, dentist help line
Lost tooth, root canal treatment, damaged teeth gums
What happen after you break a front tooth?
Knocked out front tooth
Broken tooth, trauma to front teeth
Broken tooth, damaged tooth, tooth nerve damage
Root canal, dead tooth
Dental problems
Broken teeth (child)
Nerve root damage, prognosis
What to do if your child damages his teeth
What to do about a damaged tooth, teeth and the affected damage
Broken adult tooth, damage to adult tooth
Tooth damage
Damage to teeth, injury to teeth, broken tooth
Painful teeth and what to do
Damaged infant teeth
Damaged teeth restoration, prognosis
Damaged teeth in children, resorption in a child tooth
What happens after you damage your tooth/teeth?
Dead tooth, dead root, discoloured tooth
Trauma to teeth, chipped teeth
Root canals, discolouring of teeth
Trauma, incisors children, broken teeth, removal, dentures, implants

Table 6-26 Parents' responses to question 13

Parents were asked how would they ensure the reliability of information they accessed on the internet (Table 6-27). The majority said that they would use NHS or NHS Direct webpages (72.9%) or websites of national dental associations (54.3%).

Some parents said that they would use the EDH website (47.1%) or would check the first one or two websites which they found (35.7%). Parents also said they would look for similarities in different websites (24.3%), use websites ending with “.gov” (24.3%), use websites of international dental associations (18.6%) or would avoid websites for private dentists (21.4%). Three parents added comments:

“I would surf until I found info I was looking for”

“I would not of known about the Eastman unless this had happened”

“I would look through numerous websites to find information”.

Q14: Once you have put in your search terms, how would you choose which websites to get information from?	n (%)
A website that links to NHS or NHS direct pages	51 (72.9%)
A websites that links to a national Dental Association	38 (54.3%)
I would chose a website that links to the Eastman Dental Hospital	33 (47.1%)
I would check the first couple of websites	25 (35.7%)
I would look at one website then look for similarities in other websites	17 (24.3%)
A websites that ends with .gov	17 (24.3%)
I would try to avoid websites for private dentists	15 (21.4%)
I would chose websites that link to (the) international Dental Association(s)	13 (18.6%)
Other	3 (4.3%)

Table 6-27 Parents' responses to question 14

(NB: The total number of parents responding to this question was 66. Respondents were allowed to tick more than one option; therefore percentages do not add up to 100).

Question 15 asked if parents had ever searched for online videos regarding trauma and 12.9% had looked for videos after their child had experienced trauma (Figure 6-9). However, the majority reported that they would be interested in watching online videos if they included available treatment options (40.0%), what could happen to the damaged teeth (35.7%) and what they should do if someone suffered trauma (24.3%). A number of parents said they would watch a video because it would remind them what the dentist had told them following their child's

trauma (22.9%) or because they thought this was preferable to asking people (21.4%) (Table 6-28). However, 27% of respondents were not interested in watching videos about dental trauma and one parent commented that:

"I prefer photos and information pages than videos".

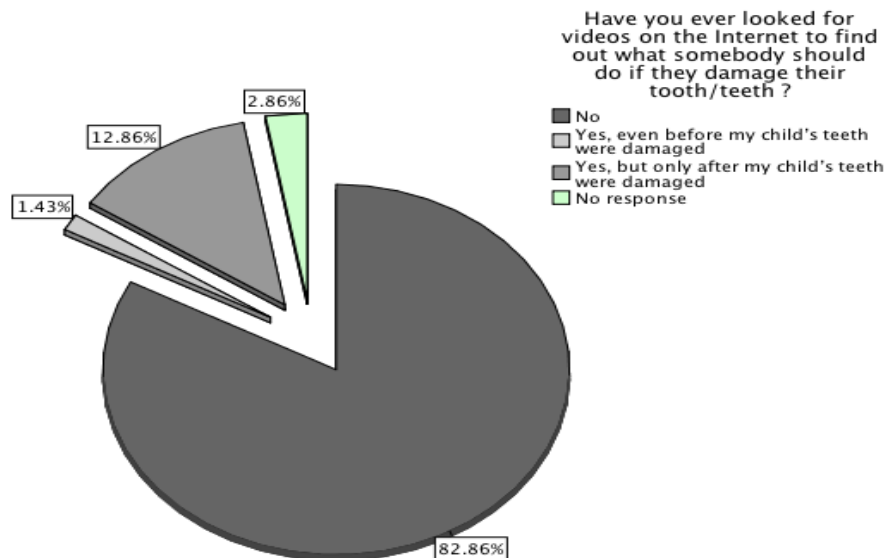


Figure 6-9 Parents' responses to question 15

(NB: The total number of parents responding to this question was 68, therefore percentages do not add up to 100).

Question 16 asked about using smart phone applications but this was not a popular choice and 65.7% of parents reported that they would not be interested in downloading an App. Only 17.1% of the participants said they would download it if it was a free App, while 14.3 percent would consider it if there was a more general App incorporating information regarding dental trauma. A small number of parents said they would consider it only if the information was incorporated in an application regarding general trauma to different parts of the human body (Table 6-29).

Q16: Regarding internet videos, please look at the following statements and tick those that apply to you.	n (%)
I would like to watch a video about the treatment options for the damaged teeth	28 (40.0%)
I would like to watch a video about what might happen to the damaged teeth	25 (35.7%)
I would not want to watch videos about damaged teeth	19 (27.1%)
I would watch a video showing me what I should do if someone damaged their teeth	17 (24.3%)
Watching a video following my child's dental appointments would help me to remember what the dentist said about the damaged teeth	16 (22.9%)
I would prefer watching a video about damaged teeth than getting the information by asking other people.	15 (21.4%)
Other	1 (1.4%)

Table 6-28 Parents' responses to question 16

(NB: The total number of parents responded to this question was 62, therefore percentages do not add up to 100).

Q17: Would you use a phone application "APP" about damaged tooth/teeth?	n (%)
No, I would not use an "app" about damaged teeth	46 (65.7%)
I would only look at the "app" if it was free	12 (17.1%)
I would download it only if the information regarding damaged teeth was incorporated with other general important and useful information	10 (14.3%)
I would download an "APP" specifically about damaged teeth	7 (10.0%)
I would download it only if it was in an application regarding trauma to different parts of the body including teeth	6 (8.6%)

Table 6-29 Parents' responses to question 17

(NB: The total number of parents responding to this question was 65, therefore percentages do not add up to 100).

6.4.5 Media

Around half of the parents said they were not interested in watching a television show (45.7%) or listening to a radio programme (48.6%) about trauma. However, 44% said they would read a newspaper or magazine article even before their child had experienced trauma (Figure 6-10, Figure 6-11 and Figure 6-12).

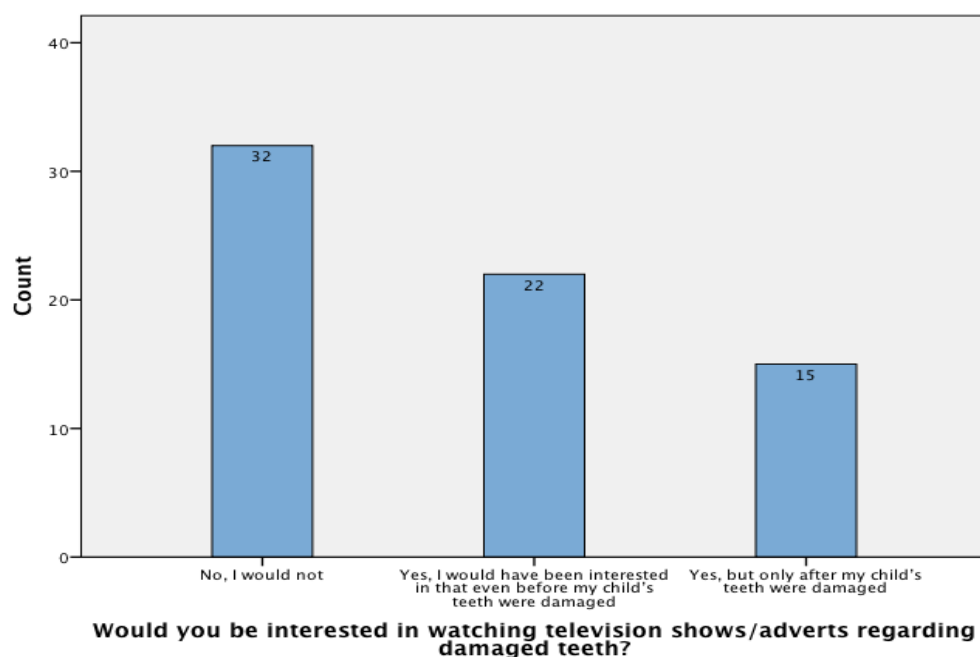


Figure 6-10 Parents' responses to question 18

(NB: The total number of parents responding to this question was 69, therefore percentages do not add up to 100).

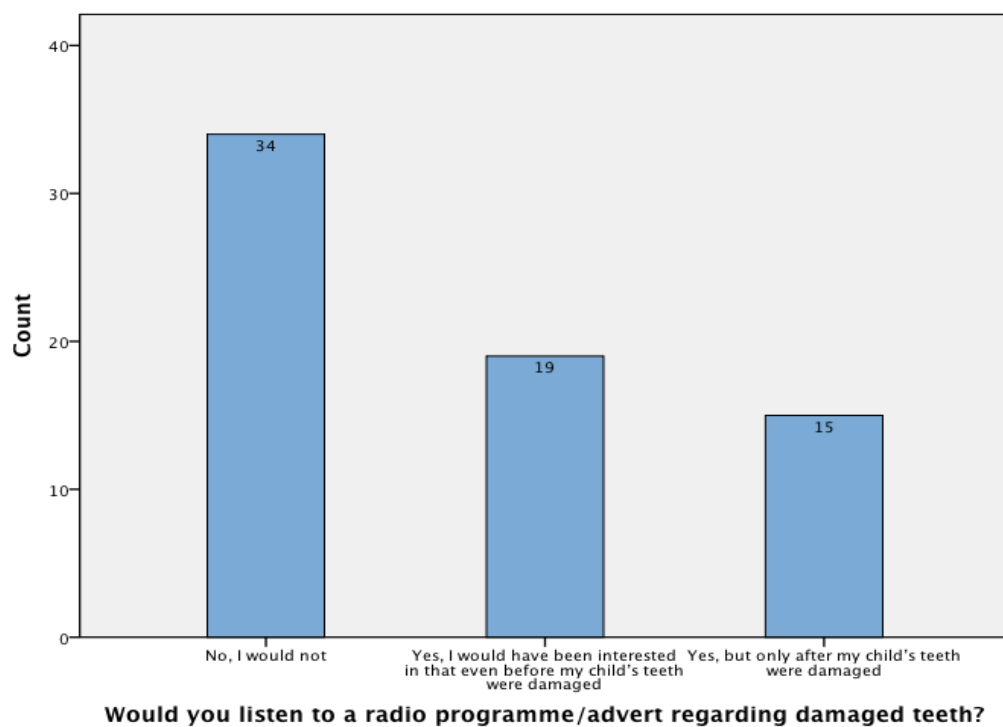


Figure 6-11 Parents' responses to question 19

(NB: The total number of parents responding to this question was 68, therefore percentages do not add up to 100).

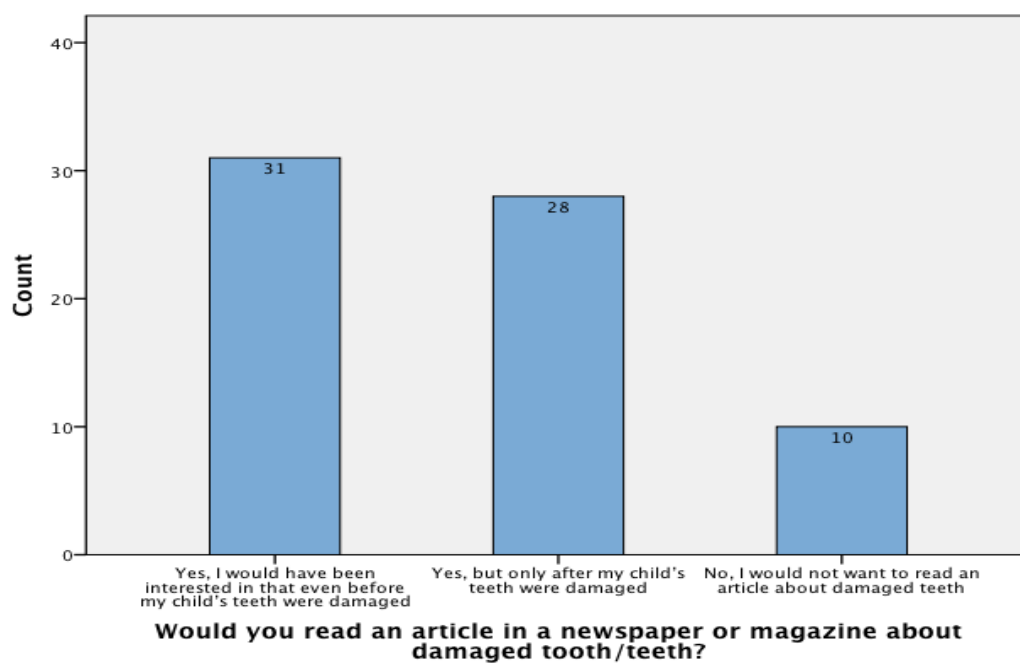


Figure 6-12 Parents' responses to question 20

(NB: The total number of parents responding to this question was 69, therefore percentages do not add up to 100).

6.4.6 Preferred source of information

The preferred source of information for the parents was written information (45.7%), followed by verbal information (32.9%) and the internet (11.4%). Only 1 parent wanted to receive information from other media (1.4%) (Figure 6-13).

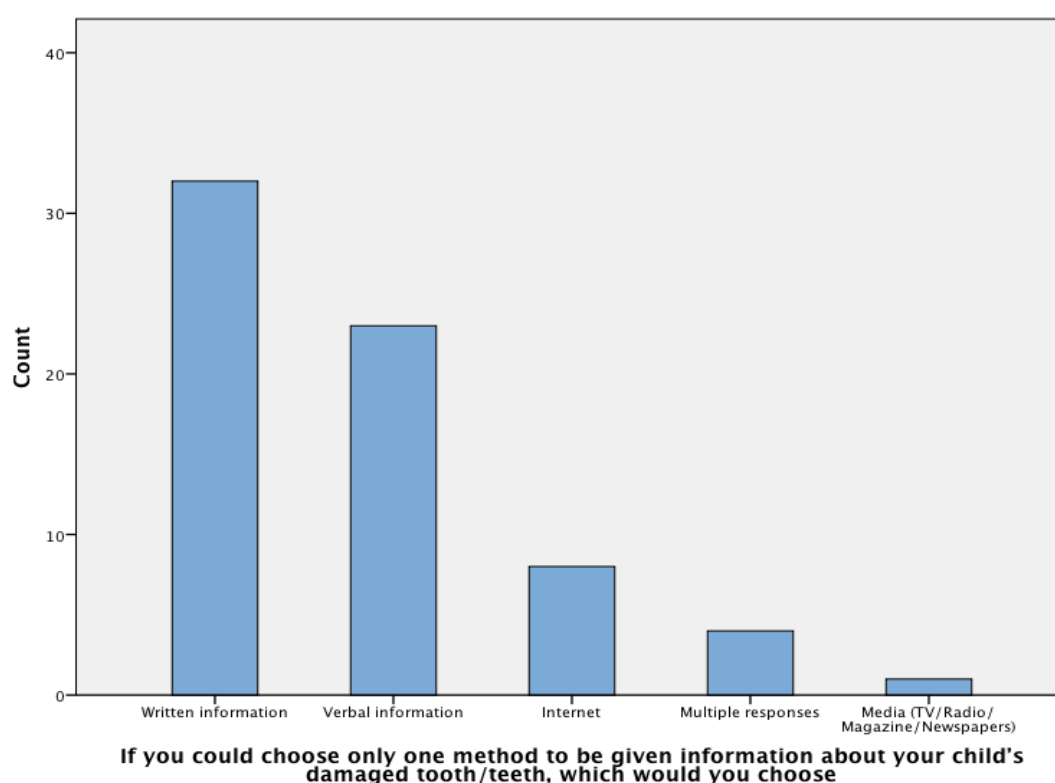


Figure 6-13 Parents' responses to question 21

(NB: The total number of parents responding to this question was 68. Respondents were asked to tick only one option, however, 4 ticked more than one option, therefore percentages do not add up to 100).

6.4.7 Raising public awareness towards dental trauma

Most of the respondents thought that raising public awareness about trauma is important (Table 6-30). Seventy-five percent thought that information should be readily available at the dentist waiting areas. Parents also thought dentists should visit schools to educate children what to do following trauma (67.1%), teach sports

personnel (61.4%) or school teachers (51.4%) the basics regarding what to do following dental trauma and make NHS Direct or emergency phone numbers available to people in case of dental trauma (61.4%). Around half of parents supported making the information available in GMP surgeries (52.9%), sport clubs (44.3%) and hospital waiting rooms (37.1%) or having a sport role-model to advise and advertise preventive devices such as mouthguards (37.1%).

Q22: How can we make other people aware of what to do if somebody damages their teeth?	n (%)
I do not think it is important to let anyone know unless it happened	9 (12.9%)
Information in dentists' waiting rooms (posters, information leaflets, videos etc.)	53 (75.7%)
Dentists should visit schools to explain to children what to do if a child damages their teeth	47 (67.1%)
By teaching those who run sport clubs what to do if a child damages their teeth	43 (61.4%)
NHS direct phone lines to guide parents and patients where to go or what to do if trauma happens	43 (61.4%)
Information in Doctors' waiting rooms (posters, information leaflets, videos etc.)	37 (52.9%)
By giving school teachers special training about what to do if a child damages their teeth	36 (51.4%)
Information in sports clubs (posters, information leaflets etc.)	31 (44.3%)
Posters in sports places (e.g. swimming pools)	28 (40.0%)
Magazine or newspaper articles	27 (38.6%)
Information in hospital waiting rooms (posters, information leaflets etc.)	26 (37.1%)
Well-known sports role models could advertise the importance of wearing mouth guards for sports	26 (37.1%)
TV adverts and programmes	23 (32.9%)
Posters in public places (e.g. on public transport)	20 (28.6%)
Publicity campaigns in schools	15 (21.4%)
A video to show people what to do if their tooth was damaged	15 (21.4%)
Information given at after school clubs	12 (17.1%)
A youth bus that travels to different places to educate young people	10 (14.3%)
Radio adverts and programme	7 (10.0%)
Other	3 (4.3%)

Table 6-30 Parents' responses to question 22

(NB: The total number of parents responding to this question was 69, therefore percentages do not add up to 100).

Two parents made comments on this question including:

“I contacted NHS direct and the 111 number and they could not give me the number of an emergency dentist”

“A website directory of out of hours places to go in an emergency locally so post code specific”.

Question 23 asked parents to write any other comments they felt relevant and which were not covered in the previous questions, those comments are summarised in Table 6-31.

Parent ID	Comment
1	I was extremely happy about the treatment received by my daughter at Eastman dental hospital
6	This information needs to be given primarily to dentists whom would be
14	The care from the specialists and nurses was excellent; the information provided was clear and understandable.
15	Since 2011 of having tests on relevant teeth, we seem to have lost our way in terms of what the future holds for the teeth. Issue of braces extremely likely requirement
20	The treatment received to date has been excellent.
22	On our first visit we entered wrong section of the hospital and was told there was no A&E department here and we need to go to st Mary's hospital, I did not know how to find that hospital so I walked along and came into correct entrance where I was informed by the security guard that there was A&E available for children, I will be forever grateful for the assistance from that security guard
27	Questionnaires too help, info in an easy format needs to be concise and delivered
29	The treatment received at the Eastman has been exceptional thank you very much.
42	We were given list of emergency dentists at the time at the hospital
44	My main concern is how it will affect her smile in the future and that she cannot bite into food like she used to
47	Emergency care was hard to get in our area
49	No need to do anything leave to dentists
51	Again I was amazed that there was no emergency help at weekends and

	bank holidays other than A&E and they were not sure about what to do
54	For dentists to refer early if there is a need to refer to be given the options at early stage

Table 6-31 Parents' responses to question 23

6.5 Differences between patients and parents' information

seeking behaviour

Sixty-three paired patients/parents participated in the study and a comparison was made between the patient and parent responses. The majority of questions and responses in questionnaires were the same, therefore, comparison was possible for the majority of questions. Table 6-32 demonstrates the percentage of agreement between paired patients/parents. The highest agreement was found for the initial information needs section, where 51 (80.9%) of the paired patients/parents reported being concerned about the severity of the damage and 43 (68.2%) about the possible long-term consequences of trauma. Thirty-seven (58.7%) of the paired patients/parents thought that written information would remind them about what their dentist had said and 49% were concerned whether the colour of the tooth would change. The agreement for the other questions was lower.

Question	Agreement n (%)
Initial information need	
• Which teeth were damaged	19 (30.1%)
• What had actually happened to my teeth	22 (34.9%)
• How bad the damage was	51 (80.9%)
• What might happen to the teeth in the future	43 (68.2%)
• Would the dentist be able to save the teeth	31 (49.2%)
• If the nerve in the tooth/teeth would die	15 (1.5%)
• Would the teeth hurt in the future	19 (30.1%)
• Would any treatment to the teeth be painful	18 (28.5%)
Concerns in the middle of treatment	
• If the filling would fall off (If the filling/cap my dentist placed would fall off)	13 (20.6%)
• If you would be able to bite/chew with the damaged teeth	26 (41.2%)
• If you would be able to brush the damaged teeth	6 (9.5%)
• If you could still have braces put on	18 (28.5%)
• If the nerve in the damaged teeth would die	24 (38.0%)
• If the gum would bleed when you brush your teeth	6 (9.5%)
• If the colour of the damaged teeth would change	31 (49.2%)
• If you would need any injections for future treatment on the teeth	9 (1.5%)
Preferred source of verbal information	19 (30.1%)

Preferred source of written information	14 (22.2%)
Written information leaflet	
• Remind me about what the dentist said	37 (58.7%)
• It would not be useful as it was not written specifically for me	2 (3.1%)
• I would like to see photos of what might happen to the teeth	26 (41.2%)
• I would like to see cartoon pictures of what might happen to the teeth	6 (9.5%)
• I would like to see a mix of photographs and cartoon pictures showing what might happen to the teeth	8 (12.6%)
• I would like the written information to be arranged in bullet points	6 (9.5%)
• I would like to have information given as questions and answers	22 (34.9%)
• I would like it to include other patients' stories and experiences	1 (1.5%)
Use of online videos	4 (6.3%)
Use of phone application	27 (42.8%)
Read article regarding trauma	23 (36.5.2%)
Preferred method of receiving information	19 (30.1%)

Table 6-32 Agreement between paired patients and parents

Chapter Seven

Discussion- Phase II

7 Discussion of Phase 2

7.1 Questionnaire development

Questionnaires were selected as a tool for the second phase of this study because it allows data collection from a larger cohort of patients and parents in a short period of time. Questionnaires also allow the use of quantitative analysis of data using descriptive statistical analysis; and provided patients and parents with exactly the same question and responses, reduced the risk of bias, and gave participants the privacy to express feelings and concerns which they might feel embarrassed to talk about. Patients and parents were more likely to accept taking part in this phase of the research as completing questionnaires is generally quicker and more convenient than interviews. Additionally, they could complete the questionnaires whenever they wanted, for example parents, often did this whilst their children were having treatment.

The questionnaires were developed following the methodology of Williams (2003) where themes and subthemes identified by patients and parents are included. Two different questionnaires were developed for patients and parents, as the responses from the interviews were different in some cases, although the main themes were the same. From the interviews, it was clear that the majority of patients and parents were interested in coloured and attractive information leaflets, therefore, the questionnaires were made colourful with cartoon pictures for the patient questionnaires to make them more appealing. The questions were clear and used bold font with underlining for key words where required. The majority of questions had an "Others" option in case respondents felt that they had something else to add. In both the pilot and formal questionnaire distribution stage, patients and parents made additional comments which was expected due to the variety of types of trauma and the length of treatment with all possible complications and outcomes. The majority of questions were closed question with response options clearly stated as this has been shown to enhance responses, however, there were also two open questions in both questionnaires; the majority of respondents answered the question regarding the search terms they would use to look for information on the internet, however, few of the respondents wrote comments for the last question in the questionnaires. This question asked for any other thoughts and respondents felt they did not have any additional comments as relevant points had already been covered

or they may not have wished to make the effort to add any other comments, having completed a fairly lengthy questionnaire.

7.2 Questionnaires distribution and piloting

The questionnaires were designed to be distributed to patients and parents attending the EDH, which is considered a centre for dental trauma emergency and treatment. The questionnaire was relatively easy for the staff on this clinic to distribute and did not disrupt the clinic to too great an extent. It is difficult to establish an appropriate sample size for an opinion study of this type, therefore a similar paper looking at information seeking behaviour in orthodontics was used for guidance (Stephens *et al.*, 2013). This information, combined with a knowledge of the number of patients attending trauma clinics and the time frame of the study, led the research team to aim to collect in the target of 50-75 patients and parents.

The ethical approval took 4 months for this part of study due to a delay in obtaining the sponsor signature and this was outside the control of the research team. During this period, the questionnaires were piloted with 13 patients and 13 parents. A separate consent forms and information sheets were used for this piloting stage. The response rate for this was very good with 18 patients and parents originally recruited and 13 agreed to participate. To maximise participation chance, parents and patients were approached in person by research student (NB) before their appointment time or when they were sent to the x-ray department rather than asking them to stay at the end of, often lengthy, appointments.

In order to ensure that the questionnaires could be completed within a reasonable time, patients and parents were timed during the pilot study also and most respondents took around 10-15 minutes for patients and 17-20 for parents which was felt to be reasonable. All participants in the pilot study were also asked for their feedback, some parents thought the questionnaires were slightly long, but did not feel this would preclude them from taking part.

Three versions of the questionnaires were piloted and each version was reviewed with the whole research team. Following the initial pilot, one major correction was made to question 8 on the parent questionnaire and question 7 on patient questionnaires. These questions were previewed as being confusing and were therefore modified accordingly. Other minor suggestions were made including adding more responses to the existing ones. Piloting was continued up to the third version at

which stage no additional comments were received and this version was then sent to the Ethics Committee for approval to start phase II of the study.

Readability of the questionnaires was checked using the Flesch Reading Ease™ and Flesch Kincaid Grade Level™ tests. Although it was aimed initially to have an average age of 10 years, both questionnaires were around a reading age of 11 years and this was felt to be acceptable. The language used for both questionnaires was easy and clear. All participants appeared able to read the information leaflets and questionnaires and there were no reported difficulties in the main study.

Validity of the questionnaires was achieved as they were based on the patient and parent interviews. Face validity was ensured through reviews with the research team reviews, ethical committee review and participants who piloted the questionnaires. In addition, through comparison between the results from the questionnaires with those of the interviews, which is highlighted in detail in the relevant discussion section.

7.3 Discussion of questionnaires' results

7.3.1 Demographic data and response rate

Inclusion criteria for this phase of the study were similar to Phase I. the average age was slightly higher, but the male to female ratio was almost the same. The parent's male to female ratio in this phase was different as it was almost 1:1 in Phase I but it was about 1:3 for Phase II. The higher number of mothers was expected as mothers usually attend dental appointments with their children. Eighty-six patients and parents were approached and asked to participate, and 68 patient and 70 parents actually participated giving an excellent response of 87% for parents and 79% for patients.

7.3.2 Questionnaires results

7.3.2.1 Information need

The majority of patients wanted to know initially following trauma if their teeth could be saved, the possible outcomes in the long-term, the planned procedure and what had actually happened. However, most of them recognised that the amount of information which could be retained was limited due to the shock of the situation. Surprisingly only half of the patients were worried about pain at this stage, but this is

probably because they were more worried about the long-term implications of the trauma. One interesting comment came in the pilot questionnaire by a patient who mentioned that he was too young to understand the treatment he was about to have. Similar initial concerns were reported by the majority of parents in addition to the severity of the damage. These concerns should therefore be considered; standard information should be provided to all patients and parents at their first appointment, and then additional information can be provided as needed in simple and plain language so that even very young patients can understand.

During the treatment, both patients and parents were concerned about the function and aesthetics of the teeth and wanted to know if they could use the damaged tooth for eating, if the colour of the tooth would change and if they could still have orthodontic treatment. The average age of children in this study was 13 years and most children of this age start to be more aware of their personal image and concerned about their dental aesthetics, regardless of their gender or social background, (Burden and Pine, 1995). In addition, at this age children often start orthodontic treatment, which is consistent with the findings.

In the long-term, parents were most worried about the prognosis of their child's damaged teeth, treatment options, treatment in adulthood and also the cost of treatment. Parents expressed those concerns probably because children receive free NHS treatment until their 18th birthday but are likely to have to pay for dental treatment thereafter. The average cost of treating a single traumatised tooth was estimated to be £856 in a study by Wong and Kolokotsa (2004). These costs included only the direct treatment costs and the estimated costs of missed work by parents and did not include travelling expenses or possible long-term treatment. Long-term treatment could include bleaching, composite fillings, crowns, implants and re-treatment, in addition to all of the possible indirect expenses, therefore the true cost of dental trauma into adulthood is unknown.

7.3.2.2 Verbal Information

The majority of patients wanted to receive information from their dentist at the EDH rather than their own dentist. This could be because the dentists at the EDH are specialised in Paediatric Dentistry, trained to communicate with children and involve them in the treatment process, and are more experienced in dental trauma than many GPs. Participants in the interviews also discussed that they preferred to receive information from dentists, as they trusted him/her, and felt they had the

necessary experience and could answer questions. Talking to the dentist was reported to help reducing patient anxiety associated with fear of the unknown (Habibian *et al.*, 2003).

Some patients said they would talk to their parents or friends rather than a dentist and these patients were generally younger, i.e. less than 13 years, which was consistent with the findings of the interviews. This could be because children think they will not understand what the dentist says because they are still young they may feel that the dentist does not involve them in discussions and speaks to their parents instead (Lewis *et al.*, 1991). The majority of patients attending paediatric clinics usually attend with their parents (Lewis *et al.*, 1991), and it has been reported that parents retain more verbal information compared with their children (Thomson *et al.*, 2001). Therefore it is important to involve the parent and provide them with the information needed so that they can help their children to understand reliable information. This needs to be done with caution however, as parents may pass unwanted feelings of fears and uncertainties to their children (Hart and Chesson, 1998; Smith and Callery, 2005) or may not remember all that they have been told. In addition, verbal information should be provided to patients in simple language suitable for all ages to understand.

Parents were happy to receive information from either their child's own dentist or the dentist at EDH. The GDP is often the first person people go to if they have a dental problem, and parents understandably therefore trust someone they have built this relationship with. However, parents in the interviews mentioned that their GDPs were not always very informative or did not know the emergency management following dental trauma. This highlights the need to educate GDPs about the emergency management of dental trauma, and the importance of appropriate referral to specialist centres.

7.3.2.3 Written information

When respondents were asked how they would most like to receive written information, the majority of patients (38.2%) and parents (28.6%) preferred to receive a summary letter because this would be written specifically for their condition and not just contain general information. This correlates with the findings of the interviews, where patients and parents wanted the letter to include a summary of the treatment and some follow-up instructions. The second most preferred method for children was a leaflet, while parents preferred a more detailed booklet. This was consistent with

the interview findings where parents wanted more detailed information, while children wanted to hear the most important and basic information.

When patients and parents were asked why they thought an information leaflet was important, the majority said they would read it to remind themselves what the dentist had said. This was similar to the previous studies investigating information retention in parents and patients. Patients tended to retain less information than their parents following verbal information only but patients and parents both retained information better using written information (Thomson *et al.*, 2001). It could be argued that information leaflets are often prepared for parents rather than patients in dental settings, so, this could be why patients did not choose it as the preferred source if the language used in difficult and patients cannot understand them. One of the parents made a comment that these leaflets should be made in simple and plain language. This suggests that separate information leaflets for children and parents may be beneficial.

When patients and parents were asked what images they would like to see in an information leaflet, 53 (77%) patients wanted to see clinical photographs, 15 (22%) wanted to see a mixture of photographs and cartoons and 11 (16%) wanted to see cartoons only. This was consistent with the findings of a study of information seeking behaviour in orthodontics done by Stephens *et al.* (2013). Most of those who wanted to see cartoons only were in the younger age group (13 and below). In contrast, parents were not particularly concerned about pictures; the majority (72%) did however specify that they wanted the leaflet to include emergency contact numbers. This reflects their probable need for emergency contact numbers at the time of their child's trauma or during treatment if problems were experienced.

7.3.2.4 World wide web

7.3.2.4.1 Internet

The majority of patients and parents used the internet everyday or several times a week. Children tended to use it for homework, watching videos or playing online games. These findings were consistent with the interview findings and were similar to the results from a previous study looked at information seeking behaviour in orthodontic patients of a similar age group (Stephens *et al.*, 2013). Parents tended to use the internet for checking their emails, online shopping and research work. These

findings coincide with overall increase in the UK population use of the internet for seeking information (Savolainen, 2006).

The majority of respondents mentioned they would use Google™ to look for information regarding dental trauma and mentioned that they would use the words “damaged teeth” as search terms. This key word was used in Google™ (date 10/07/2014) and none of the national or international associations of dental traumatology, Endodontics or Paediatric dentistry or even NHS websites appeared until the 20th page. When the second most frequently suggested words “Broken teeth” were used, the NHS website appeared only on the second page. Only 1 patient and 7 parents would have used the word “Trauma”. So, it is important to report these findings to organizations such as International Association of Dental Traumatology (IADT) to ensure that the use of plain language words allows their websites to be readily accessed and appear in the first page of the listed websites.

Patients reported YouTube as the second most common website they would use to look for information regarding dental trauma, but when similar key words were used, no results were identified. Wikipedia has a page for “broken teeth” but the amount of information is minimal (Wikipedia, 2014). Only 19% of the patients stated that they would use Wikipedia and there was concerns regarding the reliability of the information.

Parents were more aware of more reliable sources and ranked the NHS website as their second most common website to look for information regarding trauma. Unfortunately, the NHS website does not contain a page for the key word “Damaged teeth”, but it does contain a page about “Broken or Knocked-out teeth”. The page contains basic information about trauma to the deciduous and permanent dentition, and gives simple advice following avulsion or fracture of the teeth. This page could be used for those who do not know what to do following trauma, but extra details need to be added regarding after-care, possible outcomes and long term-prognosis (NHS, 2014).

Although the majority of parents and patients who were interviewed and completed the questionnaires used the internet regularly in their everyday life, they did not choose the internet as their most preferred source of information. This was a surprising finding as the research team had assumed that the internet would be one of the most preferred sources of information. These findings may reflect the poor

quality and limited information available on the internet. Some websites are available which have good quality information, such as the “Dental Trauma Guide”, but this website is mainly directed at dental practitioners and not lay people (Dental trauma guide, 2010). Therefore, it is important to develop a reliable source of information for patients and parents.

A small number of the patients and parents did not answer some of the questions in this section mainly because they do not use the internet at all and questions 10,11 and 13 in the patient's questionnaires, and 11,12,13 in the parent's questionnaires and 14 did not include this response in the list. This was not highlighted during piloting the questionnaires and was not realised until the analysis stage.

7.3.2.4.2 Videos

The majority of children mentioned that watching online videos was one of the most common reasons for using internet, but the majority of patients said they would be not interested in watching a video regarding dental trauma. This contradicts the findings from a study if ISB in orthodontic patients, where the majority of patients were interested in watching a video about braces (Stephens *et al.*, 2013). This could be because orthodontic treatment is an elective procedure and patients chose to undertake the treatment and watching a video in this situation would help clarify the issues needed in a more pleasant way. Trauma on the other hand is an emergency situation, and can be distressing, and patients mentioned that watching a video regarding trauma would be “off putting”. Similarly, most of the parents were not interested in watching videos regarding dental trauma. This contradicts a previous study conducted by Wahl *et al.* (2011), where parents or carers suggested watching a DVD, as a source of information at paediatric emergency department. This source of information was reported to be beneficial in supporting verbal information instead of prolonged procedural explanation and also appeared to benefit a group of patients where language could be a barrier or where there were reading difficulties (Wahl *et al.*, 2011).

7.3.2.4.3 Smartphone application “APP”

More than the half of patients and parents said they would not download a smart phone application regarding dental trauma and they would rather look on the internet than downloading an application. However, with the increasing popularity of smart phones and tablets, this may change in the future.

There was one phone application found on Apple store regarding dental trauma using a key word "Broken teeth". IADT also published a patient based phone application but neither of these applications is free of charge to download. Providing a free app by a trusted source (e.g. NHS) may encourage more people to download an app regarding dental trauma, or to incorporate dental trauma in a generalised health app from a trusted source.

7.3.2.5 Media

Few of the parents were interested in watching a television programme regarding trauma, however, patients seemed to be more interested in watching television and 41% of the patients considered it a good way of educating the public regarding dental trauma. Interestingly, a large number (44.3%) of parents said they would have been interested in reading an article in a newspaper or magazine regarding dental trauma even before their child had the problem. Only 5.9% of the children felt the same, but 38.2% would have been interested in reading such an article after they experienced trauma. The interviewed patients and parents mentioned that they had not come across any article about dental trauma before. This could be an interesting topic to suggest to sports magazines or newspapers. Organisations such as British Society of Paediatric Dentistry (BSPD), IADT, NHS, sport societies or children charities should also be encouraged to be involved in media publications, as people consider them reliable sources and would be encouraged to read their article or watch their programme.

7.3.2.6 Preferred method of information

The most preferred method chosen by patients who completed the questionnaires was verbal information from their dentist at EDH. This differed from the interviews, where the most preferred source of information was written information. This emphasizes the importance of the second phase of the study, which involved distributing the questionnaires to a much larger cohort of patients. Verbal information was followed by written information in two forms, summary letter and information leaflet. At present, the Department of Paediatric Dentistry at EDH does not routinely provide an information leaflet regarding trauma, and the results of this study indicate the need to produce such a leaflet. From the interviews, some patients suggested having different leaflets for different age groups. Information leaflets are considered a convenient way of providing information with relatively low cost. Stephens *et al.*

(2013) found that 62% of children read the information leaflet routinely provided with their appointment letter for orthodontic new patient clinic.

For parents, the preferred method was written information, in the form of summary letter or booklet. These findings were consistent with Wahl *et al.* (2011) who reported that 80.5% of the parents in a paediatric emergency department preferred to receive information from an information leaflet. Again, this contrasts the findings in the interviews where parents preferred verbal information. This preference for written information may be because the parents do not want to spend longer than necessary at the dentist and instead could receive a booklet with all of the details they want to read it in their free time. The reasons behind this really need to be explored further however.

7.3.2.7 Raising the public awareness

Although there has been an increase in the use of preventative measures against dental trauma, the prevalence of traumatic dental injuries remains the same. It has been suggested that educating the public is the key to preventing dental trauma (Sigurdsson, 2013). Therefore, patients and parents were asked if they think raising the public awareness is important, and how it can be achieved. The majority of patients and parents thought it was important to raise public awareness. The most popular method of raising awareness included dentists visiting schools to educate children and sports personnel regarding what to do if trauma happens. These methods were similar to the suggestions made by Sigurdsson (2013) where he reported that education regarding how to prevent trauma and what to do if trauma occurred should be provided to children and to those “in the vicinity” (i.e. parents, school officials and youth leaders). Patients also suggested that the GDP should discuss how to prevent dental trauma or what to do in case trauma happens during regular dental check-ups. These suggestions were consistent with previous studies which reported that all dentists should discuss the possible risk factors associated with trauma during regular check-ups (Glendor, 2008; Alonge *et al.*, 2001). Increasing the availability of information leaflets and posters in dentists’ waiting areas was also recommended by the majority of patients and parents. A previous study investigated whether patients read and remembered posters available in the GMP waiting room and evidence showed that 82% said they noticed the posters and, of those 95% read them. The authors found that older patients tended to read them

more often than younger patients and the longer the time they had to wait, the more details they could remember (Ward and Hawthorne, 1994).

The ISB of patients and parents towards trauma was found to be different when the extent of agreement between them was investigated. Therefore, it is important to understand that the information needs of patients and parents differ and information provision should be tailored for each group accordingly.

Chapter Eight

Recommendations

8 Recommendations

- Patients and their parents preferred different sources of information, with patients preferring verbal information and parents preferring written information. Therefore, a combination of both sources is required.
- Patients preferred verbal information, therefore a basic tick-box list (Appendix 24) has been developed to ensure that the information patients need to know is covered and this will be available in all Paediatric clinics and attached to the patients' notes to ensure that they receive the standard information.
- The most preferred source of written information for patients and parents was a summary letter for patients and parents. We routinely send a correspondence letter to the referring dentist regarding the clinical findings and proposed treatment plan and a copy of this is sent to the parents. This letter could be modified to be in plain easy to read English (or translated) to be easy for the patients and parents to understand, with a standard post-operative care paragraph which could be added to all letters (Appendix 25).
- Parents preferred written information, therefore, a booklet regarding dental trauma need to be developed:
 - The format should based on parents' preference; where information written in plain language and arranged in question and answer format with bullet points. Emergency numbers, clinical pictures, and a blank space at the end of the booklet should also be included.
 - This booklet would need to be piloted in the EDH Department of Paediatric Dentistry.
 - A survey will then need be conducted to assess parents' knowledge before and after receiving this information.
 - It is hoped this can be sent with the patient's first appointment letter and parents and patients will be encouraged to read it and prepare their questions for the dentist at that appointment.
 - This booklet could be available in the waiting room for all other patients to raise their awareness regarding dental trauma.
 - This booklet could be also uploaded to the EDH or UCLH websites to be available for everyone.

- All the above mentioned recommendations will be discussed with all dentists at departmental staff meetings; then they will be piloted and applied within the department.
- The IADT and NHS Direct will be contacted to explain the search terms which are commonly used by patients and parents, and to encourage them to ensure their sites features on the first page of listings when these terms are used.
- Posters and information leaflets could be distributed to local sport clubs with simple education regarding what to do if trauma occurs. The effectiveness could then be assessed using a simple questionnaire to evaluate the knowledge gain and to assess how confident they would feel in managing dental trauma in the future.
- GDPs should be educated regarding the immediate management of dental trauma and the need for appropriate referral to specialist hospitals. This could be done via post-graduate courses, CPD courses or conferences (such as BDA or BSPD). It is also important that GDPs are made aware of their role in preventing and educating patients and parents regarding dental trauma.

Chapter Nine

Conclusion

9 Conclusion

This study showed that patients and parents have information needs both at the time of trauma and at different stages of treatment. Initially, information regarding prognosis, severity of trauma, planned procedure are the most commonly requested information. Then, in the follow up appointments further details regarding the aesthetic, limitation in the function and the possibilities of losing the vitality of the traumatised teeth was needed. Extra information can be provided according to individual needs.

Patients preferred to receive information mainly from the dentist and younger children preferred to receive information from their parents. The second most preferred method for receiving information was written information. Parents preferred written information in the form of summary letter and detailed booklet and their second preferred source of information was verbal information. A combination of the two methods is therefore necessary to satisfy the needs of both patients and parents regarding dental trauma.

Other sources of information including the internet seemed to be more favoured by older patients and parents. It is therefore important to direct patients/parents to reliable websites to provide with the information they need without worrying them. These websites need to be in plain language and rank highly with non-technical terms are used to search for dental trauma.

Raising public awareness seems to be the key in preventing dental trauma and the dentists play a major role in educating them how to prevent them and what to do if trauma happened therefore, it is important GPs are made aware of role in preventing and educating patients and parents regarding dental trauma.

In conclusion, it is important to understand that the information needs of patients and parents differ, and to tailor information provision for each group accordingly.

Chapter Ten

References

10 References

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Chapter Eleven

Appendices

11 Appendices

Appendix 1 Favourable opinion from NRES ethical committee


Health Research Authority
NRES Committee North East - Newcastle & North Tyneside 1
TEDCO Business Centre
Room 002
Rolling Mill Road
Jarrow
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Telephone: 0191 428 3564
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15 May 2012

Dr Susan Parekh
Clinical Lecturer/ Honorary Consultant
University College London
Paediatric Department
UCL Eastman Dental Institute
256 Gray's Inn Road
WC1X8LD

Dear Dr Parekh

Study title: Information seeking behaviour patterns of dental trauma patients
and their parents, carers or guardians
REC reference: 12/NE/0194
Protocol number: 12/0110

Thank you for your email of 08 May 2012, responding to the Proportionate Review
Sub-Committee's request for changes to the documentation for the above study.

The revised documentation has been reviewed and approved by the sub-committee.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the
above research on the basis described in the application form, protocol and supporting
documentation as revised.

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to
management permission being obtained from the NHS/HSC R&D office prior to the start of
the study (see "Conditions of the favourable opinion" below).

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of
the study.

Management permission or approval must be obtained from each host organisation prior to
the start of the study at the site concerned.

*Management permission ("R&D approval") should be sought from all NHS organisations
involved in the study in accordance with NHS research governance arrangements.*

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

You should notify the REC in writing once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with updated version numbers. Confirmation should also be provided to host organisations together with relevant documentation.

Approved documents

The documents reviewed and approved by the Committee are:

Document	Version	Date
Investigator CV	Nada Othman Bamashmous	20 April 2012
Investigator CV	Adele Rees Johnson	01 February 2012
Investigator CV	Heather Buchanan	
Investigator CV	Professor Susan Cunningham	31 January 2012
Investigator CV	Dr Susan Parekh	20 April 2012
Participant Consent Form: Child Participation	1	20 April 2012
Participant Consent Form: Patients	Version 2	20 April 2012
Participant Consent Form: Parents/Guardians	Version 2	20 April 2012
Participant Information Sheet: Patients/Participants	Version 2	08 May 2012
Participant Information Sheet: Parents	Version 2	08 May 2012
Protocol	1	20 April 2012
Questionnaire: Validated Questionnaire: Short-Form Child Perceptions Questionnaire		
REC application	IRAS Version 3.4, 99783/316410/1/950	20 April 2012
Response to Request for Further Information	Susan Parekh (UCL)	08 May 2012

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document "After ethical review – guidance for researchers" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

A Research Ethics Committee established by the Health Research Authority

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

Feedback

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

Further information is available at National Research Ethics Service website > After Review

12/NE/0194	Please quote this number on all correspondence
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With the Committee's best wishes for the success of this project

Yours sincerely



(pp)

Mr Chris Turnock
Chair

Email: laura.kirkbride@sotw.nhs.uk

Enclosures: *"After ethical review – guidance for researchers"*

Copy to: *Mr Philip Diamond, UCLH*

Appendix 2 Patient's topic guide

Topic Guide

Aim: to investigate and understand the trauma patient information seeking behaviour.

1 Introduction+

Aim: to introduce self and study.

- Introduce myself.
- Introduce the study title
- Introduce the purpose.
- Explain that taking part of the study is totally voluntary and will not affect their treatment.
- Introduce recording and why we need it.
- stress confidentiality.
- Ask if they have any questions.

2 Background+

Aim: to find out about the patient's social history.

- Age of the patient
- Year in school
- Who they came with
- how they like to spend their free time?
- Any special hobby?

3 Trauma+

- What sort of trauma did you have? Was the information given to you at the your first appointment enough?
- What type of information you think you like to receive immediately after trauma?
- What type of information you think you like to receive in follow up appointments?
- What are the methods you prefer to receive information from beside the verbal method? Why?

4 Information Seeking Behaviour+

4.1 The way in which patients look for information regarding trauma+

Aim: to find out from where patients look for information generally and specifically for trauma.

- Have you ever looked for information regarding health issue? trauma?
- Where do usually look for information? school assignments, interesting topics, health issues?
- Name all the sources you think you would use to look for dental trauma.

Verbal information:

- Who spoke to you about the trauma?

- When was it? What's the best time to receive the information?
- Was the information sufficient at that time?
- Was it easy to maintain the information at that time?
- Do you think it's better to have all the information in a single time or to have them in different appointments as the treatment goes?
- Have you spoken to a friend, family member before you come to the appointment regarding the trauma?
- Did it help you prepare for your trauma appointment?

Written information:

- Have you ever seen an information leaflet or health care?
- Did you read it?
- If yes:
 - Why would you read a leaflet?
 - What do you like/dislike about that leaflet?
 - What do you think will improve it?
 - Why do you like information leaflet?
 - What are the good points about them?
- If no:
 - Why you did not read it?
 - What do you think will make you read it?
 - What are the bad points about the leaflets?

Internet

- Have you ever used the internet?
- How often do you use the internet for?
- Have you ever used it to look for information? What type of information?
- Why you like to use it?
- What do you like/dislike about it?
- Where do you usually look for information (search engine, Wikipedia, NHS websites)?
- Who told you about it?
- How do you make sure that these information are right?

Other methods

- Have you ever looked for information regarding trauma in magazines, news papers, television?
- What did you like/dislike about it?
- Do you prefer receiving information using these methods?

4.2 The reason why patient look for information+

Aim: to find out the patient's information seeking behaviour and why they look for information in general and specifically for dental trauma.

- Why do you usually look for information?
- Have you ever looked for information regarding trauma?
- Why?
- Was it before or after you had the trauma?

- If before, why? heard about it, any of your friends or family members had trauma?
- Do you think it helped/would help you preparing for the appointment?
- Was it your idea or someone else's? Who was it?

4.3 Type and amount of information they like to receive+

Aim: to investigate how much information the patients like to receive and if they are satisfied by the amount of information already given.

- What type of information you think you want to receive.
- How would you like to receive it?
- Do you think it would be better if you knew about the possible types of trauma and how to prevent them?
- How would you like to receive these information?
- Were the information given to you in your trauma appointments enough?
- At any point of the treatment would you like to receive the information?
- Where would you tell your friends to look for information about dental trauma?

5 Raising public awareness+

%

Aim: to identify the possible sources to raise the public awareness regarding trauma

- How can we educate people about the immediate action following trauma
- Sources can be use to raise the public awareness regarding trauma

%

%

Appendix 3 Parent's topic guide

Topic Guide (parent)

Aim: to investigate and understand the trauma patient's parent, carer or guardian information seeking behaviour.

1 Introduction+

Aim: to introduce self and study.

- Introduce myself.
- Introduce the study title
- Introduce the purpose.
- Explain that taking part of the study is totally voluntary and will not affect their child's treatment.
- Introduce recording and why we need it.
- stress confidentiality.
- Ask if they have any questions.

2 Background+

Aim: to find out about the participant's social history.

- Age.
- Level of education
- work
- how they like to spend their free time?

3 Trauma+

- What sort of trauma did your child had?
- Was the information given to you at the your first appointment enough?
- What type of information you think you like to receive at that time?
- What are the methods you prefer to receive information from beside the verbal method? Why?

4 Information Seeking Behaviour+

4.1 The way in which participants look for information regarding dental trauma+

Aim: to find out from where participants look for information generally and specifically for dental trauma.

- Have you ever looked for information regarding health issue? trauma?
- Where do usually look for information? Work related, interesting topics, health issues?
- Name all the sources you think you would use to look for dental trauma.

Verbal information:

- Who spoke to you about the trauma?
- When was it? What is the best time to receive the information?

- Was the information sufficient at that time?
- Was it easy to maintain the information at that time?
- Do you think it's better to have all the information in a single time or to have them in different appointments as the treatment goes?
- Have you spoken to a friend, family member before you come to the appointment regarding the trauma?
- Did it help you prepare for your child's trauma appointment?

Written information:

- Have you ever seen an information leaflet for health care?
- Did you read it?
- If yes:
 - Why would you read a leaflet?
 - What do you like/dislike in that leaflet?
 - What do you think will improve it?
 - Why do you like information leaflet?
 - What are the good points about them?
- If no:
 - Why you did not read it?
 - What do you think will make you read it?
 - What are the bad points about the leaflets?

Internet

- Have you ever used the internet?
- How often do you use the internet for?
- Have you ever used it to look for information? What type of information?
- Why do you like to use it?
- What do you like/dislike about it?
- Where do you usually look for information (search engine, Wikipedia, NHS websites)?
- Who told you about it?
- How do you make sure that these information are right?

Other methods

- Have you ever looked for information regarding trauma in magazines, news papers, television?
- What did you like/dislike about it?
- Do you prefer receiving information using these methods?

4.2 The reason why participants look for information+

Aim: to find out the participant's information seeking behaviour and why they look for information in general and specifically for dental trauma.

- Why do you usually look for information?
- Have you ever looked for information regarding trauma?
- Why?
- Was it before or after your child had the trauma?
- If before, why? Heard about it, any of your friends or family members had trauma?

- Do you think it helped/would help preparing your child for the appointment?
- Was it your idea or someone else's? Who was it?

4.3 Type and amount of information they like to receive+

Aim: to investigate how much information the participant like to receive and if they are satisfied by the amount of information already given.

- What type of information you think you want to receive.
- How would you like to receive it?
- Do you think it would be better if you knew about the possible types of trauma and how to prevent them?
- How would you like to receive these information?
- Were the information given to you in your trauma appointments enough?
- At any point of the treatment would you like to receive the information?
- Where would you tell your friends to look for information about dental trauma?
- Is there anything you suggest that might improve the knowledge regarding dental trauma?
- Anything else you would like to add?

%

%

Appendix 4 Patient's information leaflet for phase I

Contact details

Dr Susan Parekh; Professor Susan Cunningham; Dr Heather Buchanan; Dr Adele Johnson; Mrs Nada Bamashmous.

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Fax: 020 3456 2329
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UCL Hospitals cannot accept responsibility for information provided by external organisations.



If you need a large print, audio or translated copy of this document, please contact us on (020)3456 1023. We will try our best to meet your needs.

If you wish to discuss this study with a member of the research team or an independent expert who is not part of the research team, please ask Dr Susan Parekh

Thank you for taking the time to read this leaflet.

Publication date:
Date last reviewed:
Version number: 1

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University College London Hospitals 
NHS Foundation Trust

Information seeking behaviour patterns of dental trauma patients and their parents.

Patient's Information Leaflet



Version: 2

Date: 08-05-2012

1

Invitation

You are invited to take part in this research study. Before you make a decision, it is important that you know why the research is being done and what you will be asked to do. Please take time to read the following information carefully and discuss it with others if you wish. Please do ask if there is anything that is not clear or if you want like more information.

What is the purpose of the study?

Dental trauma (damage to teeth) in children and adolescents is a common problem worldwide. However, people do not know much about this and do not know what to do if it happens and what treatment possibilities are available. There is currently no research which looking at what information patients need to know if this happens to them. In this research, we want to find out what type of information patients and parents, carers or guardians want to know and, where do they look for this information and why.

Why have I been invited?

This study is interested in patients who have injured their teeth and we are looking for all patients who have had these types of injuries.

Do I have to take part?

The decision to take part is optional and it is entirely up to you. If you change your mind, or feel slightly distressed (by talking about your experiences of dental trauma) you

are free to withdraw from the discussion at any time, without giving a reason. The standard of care you receive will not be affected in any way.

What will happen to me if I take part?

We will interview you and ask you some questions about what types of information you would like to know about dental injuries to the teeth and where you might look for this information. This should only take about 15-20 minutes depending on how much you want to say. There are no right or wrong answers; we are just interested in your ideas. Some of these ideas then be used to develop a questionnaire for a larger study on this subject and we then hope to be able to improve the information which we make available to patients and their parents. You will not need to do anything else. We would prefer to interview you by yourself, however, if you like your parents to be with you then that is absolutely fine.

What are the possible disadvantages or risks of taking part?

There are no risks anticipated. None of your answers will affect your treatment in any way.

What are the possible benefits?

We cannot promise the study will help you directly but the information we get from this study will help us to provide better information about dental trauma and will hopefully allow patients to understand these issues much better in the long term.

What will happen with the results?

We hope to publish the results of the study on completion. All confidential information will be coded and you will not be identifiable in any way. Direct quotes may be used but they will remain completely anonymous.

Will my taking part in the study remain confidential?

Yes. All information collected from you during the research will remain strictly confidential and will be seen only by the investigators named on this sheet. The safety and security of the data will be the responsibility of the principal investigator (Dr Susan Parekh). The data held about you will include the information from the interview and also your gender (male or female). This information will be recorded in such a way that it is completely anonymous and you will not be individually identified in anyway.

Who has reviewed the study?

All researches in the NHS are looked at by independent group, called a Research Ethics Committee to protect your safety, rights, wellbeing and dignity. This study has been reviewed by NRES Committee North East – Newcastle and North Tyneside 1) Research Ethical Proportionate Review Sub-Committee. If you would like to see a summary of the findings from the study when it is completed, please tell Dr Parekh or any of the other dentists you see.

Version: 2

Date: 08-05-2012

2

Appendix 5 Parent's information leaflet for phase I

Contact details

Dr Susan Parekh; Professor Susan Cunningham; Dr Heather Buchanan; Dr Adele Johnson; Mrs Nada Bamashmous.

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Fax: 020 3456 2329
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If you need a large print, audio or translated copy of this document, please contact us on (020)3456 1023. We will try our best to meet your needs.

If you wish to discuss this study with a member of the research team or an independent expert who is not part of the research team, please contact Dr Susan Parekh

Thank you for taking the time to read this leaflet.

Publication date:
Date last reviewed:
Version number: 1

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University College London Hospitals 
NHS Foundation Trust

Information seeking behaviour in dental trauma patients and their parents.

Parent's Information Leaflet



Version: 2

Date: 08-05-2012

1

Invitation

You and your child are being invited to participate in this research study. Before you make a decision, it is important that you know why the research is being done and what you will be asked to do. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the study?

Dental trauma (damage to teeth) in children and adolescents is a common problem worldwide. However, people do not know much about this and do not know what to do if it happens to their child and what treatment possibilities are available. There is currently no research which looked at what information patients need to know if this happens to them. In this research, we want to find out what type of information patients and parents, carers or guardians want to know and, where and why they might look for this information.

Why has my child been chosen?

This study is interested in patients who have injured their teeth and we are looking for all patients who have had these types of injuries.

Does my child have to take part?

The decision to take part is optional and it is entirely up to you and your child. If you decided to take part, you will be asked to sign a consent form for your own and your child's participation. If you change your mind, or feel slightly distressed (by talking about your

experiences of dental trauma) you are free to withdraw from the discussion at any time, without giving a reason. The standard of care you receive will not be affected in any way.

What will happen to me and my child if we took part?

We will interview you and your child separately and ask you both some questions about what types of information you would like to know about dental injuries to the teeth and where you might look for this information. This should only take about 15-20 minutes depending on how much you both want to say. There are no right or wrong answers; we are just interested in your ideas. Some of these ideas will then be used to develop a questionnaire for a larger study on this subject and we then hope to be able to improve the information which we make available to patients and their parents. You will not need to do anything else. We would prefer to interview your child by themselves, however, if your child would like you with him/her then that is absolutely fine.

What are the possible disadvantages or risks of taking part?

There are no risks anticipated. None of you and your child's answers will affect your child's treatment in any way.

What are the possible benefits?

We cannot promise the study will help you directly but the information we get from this study will help us to provide better information about dental trauma and will hopefully allow patients to understand these issues much better in

the long term.

What will happen with the results?

We hope to publish the results of the study on completion. All confidential information will be coded and you will not be identifiable in any way. Direct quotes may be used but they will remain completely anonymous.

Will my taking part in the study remain confidential?

Yes. All information collected from you and your child during the research will remain strictly confidential and will be seen only by the investigators named on this sheet. The safety and security of the data will be the responsibility of the principal investigator (Dr Susan Parekh). The data held about you and your child will include the information from the interview and also yours and your child's gender (male or female). This information will be recorded in such a way that it is completely anonymous and neither you nor your child will be individually identified in anyway.

Who has reviewed the study?

All researches in the NHS are looked at by independent group, called a Research Ethics Committee to protect your safety, rights, wellbeing and dignity. This study has been reviewed by NRES Committee North East – Newcastle and North Tyneside 1)Research Ethical Proportionate Review Sub-Committee. If you would like to see a summary of the findings from the study when it is completed, please tell Dr Parekh or any of the other dentists you see.

Version: 2

Date: 08-05-2012

2

Appendix 6 Patients' consent form for phase I

University College London Hospitals **NHS**

NHS Foundation Trust

The Eastman Dental Hospital
Department of Paediatric Dentistry
256 Gray's Inn Road
London
WC1X 8LD

Reception: 020 345 61097/61023
Office: 020 345 61273
Fax: 020 345 62329

Web-site: www.uclh.nhs.uk
20/04/12

Patient Identification Number for this study:

Form version:2

REC Ref No:

CONSENT FORM FOR PATIENTS!

1

TITLE: Information seeking behaviour in dental trauma patients and their parents..!

Name%Principal%Investigators:!Dr Susan Parekh; Professor Susan Cunningham; Dr. Heather Buchanan; Dr Adele Johnson; Mrs. Nada Barnashmous!

! ! ! ! ! ! ! ! ! ! Please tick/initial box!

1.! *!! confirm! that! !! have! read! and! understood! the! information! sheet! !*
(Version!2!dated!08!05!2012)!for!the!above!study!and!have!had!the!
opportunity!to!ask!questions!.

2.!! !!confirm!that!!have!had!sufficient!time!to!consider!whether!or!not!!
wish!to!be!included!in!the!study!!

3.1. *I understand that lit is lip to me lif!! want to take part and lif!! I don't want to take part anymore at any time!! I don't have to. It will not affect me or my care lif!! I don't want to take part.*

4.1. !!!I understand that, where applicable, irrelevant sections of my medical notes and data collected during the study may be looked at by individuals from [UCL! Eastman! Dental! Institute], from regulatory authorities or from the NHS Trust, where it is relevant to my taking part in research. !!!I give permission for these individuals to have access to my records [where applicable].!

5. I agree that the interview will be recorded. I

6.!! I agree to take part in the above study!

1

1

_____|
Name of patient! ! ! ! Date! ! ! ! !!!!!Signature of parent!

!

!

Name of Person taking consent _____ Date _____ Signature _____



UCL Hospitals is an NHS Trust incorporating the Eastman Dental Hospital, Elizabeth Garrett Anderson & Obstetric Hospital, The Heart Hospital, Hospital for Tropical Diseases, The Middlesex Hospital, National Hospital

Dr Susan Parekh 020-3456-1022

Researcher (to be contacted if there are any problems)

Comments or concerns during the study

If you have any comments or concerns you may discuss these with the investigator. If you wish to go further and complain about any aspect of the way you have been approached or treated during the course of the study, you should write or get in touch with the Complaints Manager, UCL Hospitals. Please quote the reference number at the top this consent form.

1 form for patient,
1 to be kept as part of the study documentation,
1 to be kept with hospital notes.



UCL Hospitals is an NHS Trust incorporating the Eastman Dental Hospital, Elizabeth Garrett Anderson & Obstetrics Hospital, The Heart Hospital, Hospital for Tropical Diseases, The Middlesex Hospital, National Hospital

Appendix 7 Parent's consent form for their participation in phase I

University College London Hospitals

NHS Foundation Trust

The Eastman Dental Hospital
Department of Paediatric Dentistry
256 Gray's Inn Road
London
WC1X 8LD

Reception: 020 345 61097/61023

Office: 020 345 61273

Fax: 020 345 62329

Web-site: www.uclh.nhs.uk

20/04/12

Patient Identification Number for this study:

Form version:2

REC Ref No:

CONSENT FORM FOR PARENTS / GUARDIANS FOR THEIR PARTICIPATION

TITLE: Information seeking behaviour in dental trauma patients and their parents..

Name of Principal Investigators: Dr Susan Parekh; Professor Susan Cunningham; Dr. Heather Buchanan; Dr Adele Johnson; Mrs. Nada Bamashmous

! ! ! ! ! ! ! ! ! ! ! Please tick/initial box!

1. I confirm that I have read and understood the information sheet!
(Version 2 dated 08/05/2012) for the above study and have had the opportunity to ask questions. ☐

2. I confirm that I have had sufficient time to consider whether or not I wish to be included in the study. ☐

3. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my child's medical care or legal rights being affected. ☐

4. I understand that relevant sections of my child's medical notes and data collected during the study may be looked at by individuals from [UCL Eastman Dental Institute], from regulatory authorities or from the NHS Trust, where it is relevant to my taking part in research. I give permission for these individuals to have access to my child's records. ☐

5. I agree to take part in the above study. ☐

Name of patient Date Signature of parent

Name of Person taking consent Date Signature



UCL Hospitals is an NHS Trust incorporating the Eastman Dental Hospital, Elizabeth Garrett Anderson & Obstetric Hospital, The Heart Hospital, Hospital for Tropical Diseases, The Middlesex Hospital, National Hospital

Dr Susan Parekh 020-3456-1022

Researcher (to be contacted if there are any problems)

Comments or concerns during the study

If you have any comments or concerns you may discuss these with the investigator. If you wish to go further and complain about any aspect of the way you have been approached or treated during the course of the study, you should write or get in touch with the Complaints Manager, UCL Hospitals. Please quote the reference number at the top of this consent form.

1 form for patient,
1 to be kept as part of the study documentation,
1 to be kept with hospital notes.



UCL Hospitals is an NHS Trust incorporating the Eastman Dental Hospital, Elizabeth Garrett Anderson & Obstetrics Hospital, The Heart Hospital, Hospital for Tropical Diseases, The Middlesex Hospital, National Hospital

183

Dr Susan Parekh 020-3456-1022

Researcher (to be contacted if there are any problems)

Comments or concerns during the study

If you have any comments or concerns you may discuss these with the investigator. If you wish to go further and complain about any aspect of the way you have been approached or treated during the course of the study, you should write or get in touch with the Complaints Manager, UCL Hospitals. Please quote the reference number at the top of this consent form.

1 form for patient,
1 to be kept as part of the study documentation,
1 to be kept with hospital notes.



UCL Hospitals is an NHS Trust incorporating the Eastman Dental Hospital, Elizabeth Garrett Anderson & Obstetrics Hospital, The Heart Hospital, Hospital for Tropical Diseases, The Middlesex Hospital, National Hospital

Appendix 9 Sample Information leaflet used during interviews

Will I need to wear another brace once my treatment has finished?
Once the active phase of your treatment has been finished, it will be necessary to wear a retaining brace. This may be removable or it may be fixed behind your front teeth. The length of time this has to be worn can vary.

How often will I need an appointment?
You will need regular appointments during treatment for the brace to be adjusted.

Do I still need to see my regular dentist?
Yes. It will be important you still have check-ups with your regular dentist throughout orthodontic treatment so that your teeth can be checked for decay.

What do I do if I play contact sports?
It is recommended you wear a gumshield. This will also be the case if you enjoy riding a bicycle, roller-skating, or skateboarding. You will be advised about this.

What if I play a musical instrument?
If you play a wind instrument, particularly the flute or a brass instrument, then a fixed brace may make it more difficult. You will need to discuss this with your music teacher.

What do I do if my brace breaks?
Ring up for an appointment as soon as is reasonably possible. Do not wait for your next routine appointment as the breakage may slow your treatment, or may result in damage to your teeth. If you repeatedly break your brace treatment may be stopped.


The daytime telephone number you should contact if a breakage occurs is:


Tel.....

This leaflet has been produced with guidance from the Plain English Campaign and British Dyslexia Association to make it easier for you to read.
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PATIENT INFORMATION LEAFLET

FIXED APPLIANCES





A fixed brace can be used to straighten crooked teeth like these.



Now that you have a fixed brace you may have some questions you would like answered.

Will it be painful?
It is likely to be sore for about 3 - 5 days each time the brace is adjusted. If necessary, painkillers such as the ones you would normally take for a headache may help (please read the instructions on the packet). If the brace rubs your lips or cheeks, you will be given some wax to help with this.

Can I remove the brace?
The brace you are now wearing is fixed to the teeth for the whole of your treatment. You should not try to remove it, as you may damage your teeth and the treatment will not work.

Can I eat normally?
Yes you should be able to eat normally. However, for your orthodontic treatment to work well and in the shortest possible time it is important you take care of your teeth and brace. In order to prevent damage to both, you should:

- ☐ Avoid eating toffees, boiled sweets, sugared chewing gum, chocolate bars, etc.
- ☐ Avoid drinking fizzy drinks (including diet drinks) and excessive amounts of fruit juice.
- ☐ Take care eating hard foods which might damage the brace such as crunchy apples, crusty bread, etc. Cut them up first.



What about toothbrushing?
It is important you brush your teeth well, three times per day and use a fluoride toothpaste. If possible carry a brush with you for use after lunch. Pay particular attention to brush where the gums meet the teeth. Brushing may take a little longer when you have a fixed brace. A daily

fluoride mouthrinse should also be used last thing at night, after toothbrushing, to further protect the teeth. Failure to keep your teeth and brace clean will lead to permanent scarring of your teeth as shown in the previous picture.

How long will treatment take?
It usually takes 12 - 24 months but will vary according to how severe your case is. Failed and cancelled appointments or repeated breakages of the brace will add to the overall treatment time.

Will I need to wear anything in addition to the fixed brace?
It may be necessary for you at some stage during the treatment, to wear headgear and/or elastics. Headgear is usually worn in the evenings and at night. Elastics are worn inside the mouth all the time, including mealtimes.



This picture shows a patient wearing elastics

Appendix 10 Excel spreadsheet of Framework Analysis of patients interviews

Appendix 11 Excel spreadsheet of framework analysis of parents interviews

Please see CD enclosed for Microsoft® Excel framework analysis spreadsheet.

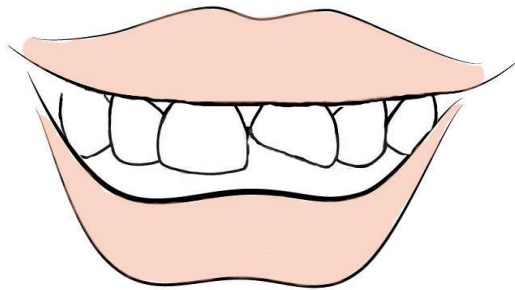
Appendix 12 Patients' questionnaire

Version:2 (10/02/2014)

!

University College London Hospitals **NHS**
NHS Foundation Trust

Hello



We know that your tooth/teeth were damaged at
some point in the past and we would like to know what
information you would find or
would have found useful

!

1

Part 1- Please tell us a little bit about you.



1. Are you?

- ☐ Male
- ☐ Female

2. How old are you?

..... years

Part 2- Information about your damaged tooth/teeth



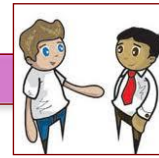
3. Which of the following did you want to know **at the time** when your tooth/teeth were damaged? (Tick **as many** boxes as you want)

- ☐ Which teeth were damaged
- ☐ What had actually happened to my teeth
- ☐ How bad the damage was
- ☐ What might happen to the teeth in the future
- ☐ Would the dentist be able to save the teeth
- ☐ If the nerve in the tooth/teeth would die
- ☐ Would the teeth hurt in the future
- ☐ Would any treatment to the teeth be painful
- ☐ If the tooth can be fixed
- ☐ Other (please say):.....

4. Which of the following did you want to know **after** you had started treatment? (Tick **as many** boxes as you want)

- ☐ If the filling would fall off (If!the!filling/!cap!my!dentist!placed!would!fall!off)
- ☐ If you would be able to bite/chew with the damaged teeth
- ☐ If you would be able to brush the damaged teeth
- ☐ If you could still have braces put on
- ☐ If the nerve in the damaged teeth would die
- ☐ If the gum would bleed when you brush your teeth
- ☐ If the colour of the damaged teeth would change
- ☐ If you would need any injections for future treatment on the teeth
- ☐ Other

Part 3- Information from other people



5. Who did you want the above information to be given by? (Tick ONE box only)

- ☐ I did not want anyone to talk to me about my damaged teeth
- ☐ Your mum or dad
- ☐ Your brother or sister
- ☐ Another relative
- ☐ Your friend
- ☐ Your friend's mum or dad
- ☐ Your own dentist
- ☐ Your dentist at the Eastman Dental Hospital
- ☐ Somebody else (please say who).....

Part 4- Reading information about damaged tooth/teeth



6. I would like to read information about my damaged tooth/teeth from: (Tick ONE box only)

- ☐ An information leaflet with just the basic information
- ☐ A booklet with lots of detailed information
- ☐ A letter from the dentist after your appointment
- ☐ I would not want to read any written information
- ☐ Other (please say who).....

7. Sometimes we give patients written information about their dental treatment, which of the following do you think are true about written information? (Tick as many boxes as you want)

- ☐ It would remind me about what the dentist said
- ☐ I would only read it if my mum or dad also read it
- ☐ Written information is generally quite boring
- ☐ I do not think written information/leaflets are eye catching usually
- ☐ Written information would not be useful as it would not be written specifically about my own teeth
- ☐ Other (please say what).....

8. What do you think would be important to be included in written information leaflet? (Tick as many boxes as you want)

- ☐ I would like to see photos of what might happen to the teeth
- ☐ I would like to see cartoon pictures of what might happen to the teeth
- ☐ I would like to see a mix of photographs and cartoon pictures showing what might happen to the teeth
- ☐ I would like the written information to be arranged in bullet points
- ☐ I would like to have information given as questions and answers
- ☐ I would like it to include other patients' stories and experiences
- ☐ Other (please say what).....

Part 5- What about us providing information about your tooth/teeth on the Internet



9. How often do you use the internet? (Tick ONE box only)

- ☐ Every day
- ☐ A few times a week
- ☐ A few times a month
- ☐ I do not use the internet at all

10.If you use the internet, what do you usually use it for? (Tick as many boxes as you want)

- ☐ Homework
- ☐ Games
- ☐ Music
- ☐ Facebook and social networking
- ☐ Watching videos
- ☐ Online shopping
- ☐ Other (please say what).....

11. Which website would you use/have you used to look for information about your damaged tooth/teeth? (Tick as many boxes as you want)

- ☐ Google
- ☐ Wikipedia
- ☐ Facebook
- ☐ YouTube
- ☐ Other (please say which).....

12.If you want to find information about damaged teeth on the internet, what words "search terms" would you use to search for this?

.....
.....
.....

13.If you look for information on the internet, you will get a list of websites,, how do you decide which website to look at? (Tick as many boxes as you want)

- ☐ I would check the first couple of websites that came up in the search engine
- ☐ I would look at one website and then look for the similarities in other websites
- ☐ I would avoid websites like Wikipedia/ WikiAnswer
- ☐ Other (please say which)

14.Have you ever looked for videos on the Internet to find out what somebody should do if they damage their tooth/teeth (e.g YouTube)? (Tick ONE box only)

- ☐ Yes, even before my teeth were damaged
- ☐ Yes, but only after my teeth were damaged
- ☐ No

15.Regarding internet videos, please look at the following statements and tick those that apply to you (Tick as many boxes as you want):

- ☐ I would not want to watch videos about damaged teeth
- ☐ Watching a video about damaged teeth might be scary
- ☐ I would prefer watching video about damaged teeth to get the information I need rather than asking other people.
- ☐ Watching a video following my dental appointments would help me remember what the dentist said about the damaged teeth
- ☐ I would like to watch a video about what might happen to the damaged teeth
- ☐ I would like to watch a video about the treatment options for the damaged teeth
- ☐ Other

16. Would you be interested in a phone application "APP" about damaged tooth/teeth? (Tick as many boxes as you want)



- ☐ Yes, especially if it told me what to do if the teeth were damaged
- ☐ Yes, especially if it told me what might happen to the damaged teeth and the possible treatment options
- ☐ Yes, if it involved games
- ☐ No, I would not use an "app" about damaged teeth

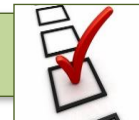
Part 6- A little bit about newspapers, magazines etc.



17. Would you read an article in a newspaper or magazine about damaged tooth/teeth? (Tick ONE box only)

- ☐ Yes, I would be interested even before my teeth were damaged
- ☐ Yes, but only after my teeth were damaged
- ☐ No, I would not want to read an article about damaged teeth

Part 7- Tell us about the way you like information to be given to you



18. If you could choose only one method to be given information about your damaged tooth/teeth, which would you choose (Tick ONE box only)

- ☐ Spoken/verbal information (dentist, parents, friends....)
- ☐ Written information (leaflet, booklet....)
- ☐ Internet (websites, videos, "app".....)
- ☐ Media (TV, radio, newspapers, magazine)
- ☐ Other (please say what).....

Part 8- Almost finished! Just the last two questions

19. How can we make other people aware of what to do if somebody damages their teeth? (Tick **as many** boxes as you want)

- ☐ I do not think it is important to let anyone know unless it happened to them
- ☐ Dentists should visit schools to explain to children what to do if a child damages their teeth
- ☐ Posters in public places (e.g. on public transport)
- ☐ Posters in sports places (e.g. swimming pools)
- ☐ TV adverts and programmes
- ☐ Magazine or newspaper articles
- ☐ By giving school teachers special training about what to do if a child damages their teeth
- ☐ By teaching those who run sport clubs what to do if a child damages their teeth
- ☐ Family dentist could explain what to do if the teeth were damaged when they see patients for regular check ups
- ☐ Information in dentists' waiting rooms (posters, information leaflets etc.)
- ☐ Information in Doctors' surgeries (posters, information leaflets etc.)
- ☐ Information in hospital waiting rooms (posters, information leaflets etc.)
- ☐ Information in sports clubs (posters, information leaflets etc.)
- ☐ Information given at after school clubs
- ☐ Publicity campaigns in schools
- ☐ A video on the internet showing people what to do if their tooth was damaged
- ☐ Other (please say what).....

20. Is there anything else you want to tell us about regarding your damaged tooth/teeth?

.....

.....

.....

.....

Thank you **very much** for filling in this questionnaire...

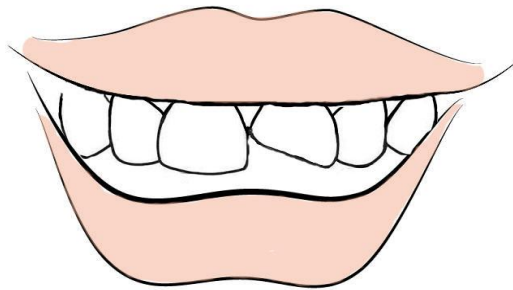


Appendix 13 Parents' questionnaire

Version:2 (10/02/2014)

University College London Hospitals 
NHS Foundation Trust

Dear Parent, Guardian or Carer



We know that your child's tooth (teeth) was damaged
at some point in the past and we would like to know
what information you would find,
or would have found, useful

!

1

Part 1- Please tell us a little bit about you.

1. Are you?

- ☐ Male
- ☐ Female

2. Are you?

- ☐ Parent
- ☐ Guardian
- ☐ Other carer

Part 2- Information about your child's damaged tooth/teeth

3. Which of the following did you want to know at the time when your child's tooth/teeth were damaged? (Tick as many boxes as you want)

- ☐ Which dentist should I take my child to?
- ☐ Which hospital should I take my child to?
- ☐ Where was the best place to get treatment?
- ☐ Which teeth were actually damaged
- ☐ What had happened to the tooth/teeth
- ☐ How bad the damage was
- ☐ What might happen to the teeth in the future
- ☐ Would the dentist be able to save the tooth/teeth
- ☐ Would the dentist be able to reposition the tooth/teeth back to my child's mouth
- ☐ If the nerve in the tooth/teeth would die
- ☐ Would the tooth/teeth hurt in the future
- ☐ Would any treatment to the teeth be painful
- ☐ What are the available options for treatment of my child's tooth/teeth
- ☐ The time frame in which treatment should happen
- ☐ Other (please say):.....
.....

4. Which of the following did you want to know after your child had started treatment? (Tick as many boxes as you want)

- ☐ If my child's damaged tooth/teeth would be painful
- ☐ What medicine I should give my child to relieve the pain
- ☐ If the root of the tooth would continue growing
- ☐ If the filling might fall out
- ☐ If my child would be able to bite/chew with the damaged teeth
- ☐ What types of food I should give to my child
- ☐ If my child should stop eating sweets and fizzy drinks
- ☐ If my child would be able to brush the damaged tooth/teeth
- ☐ If the gum would bleed when my child brushes his/her teeth
- ☐ If my child could still have braces put on
- ☐ If the nerve in the damaged tooth/teeth would die
- ☐ What signs we would see if the nerve in the damaged tooth/teeth died
- ☐ If the damaged tooth/teeth has to have an abscess in order to start root canal treatment
- ☐ If the colour of the damaged tooth/teeth would change
- ☐ If my child would need any injections for future treatment on the teeth
- ☐ If the treatment to the damaged tooth/teeth would be painful
- ☐ If there is still a chance of losing the tooth/teeth
- ☐ If my child can still play sports
- ☐ If the damaged tooth/teeth will affect how my child looks
- ☐ If the damaged tooth/teeth will affect my child's self-confidence
- ☐ How long the treatment would take approximately
- ☐ How many appointments will my child need
- ☐ How long each appointment will be !
- ☐ If my child will need to be reviewed after treatment finishes!
- ☐ Other.....

5. Which of the following would you like to know regarding the long-term outcomes of your child's damaged tooth/teeth? (Tick as many boxes as you want)

- ☐ What is the long-term prognosis of the damaged tooth/teeth
- ☐ If my child can still play sports
- ☐ If my child should wear a gum shield (sportguard) for sports
- ☐ What are the options available to us to restore my child's broken tooth/teeth when they are older (over 18 years)
- ☐ If the appearance of the damaged tooth/teeth will affect my child's self-confidence

Version:2 (10/02/2014)

- ☐ If my child can still have braces put on
- ☐ Where should we go to have the rest of the treatment after my child is over 18 years old
- ☐ If the final restorative treatment when my child is an adult will be expensive
- ☐ If the final restorative treatment when my child is an adult will take a long time !
- ☐ Other.....

Part 3- Information from other people

6. After the tooth/teeth were damaged, who did you want the information to be given by? (Tick ONE box only)

- ☐ I did not want anyone to talk to me about my child's damaged teeth
- ☐ My brother or sister
- ☐ Another relative
- ☐ My friend
- ☐ My child's own dentist
- ☐ My child's dentist at the Eastman Dental Hospital
- ☐ My child's doctor
- ☐ Somebody else (please say who).....

Part 4- Reading information about damaged tooth/teeth

7. I would like to read information about damaged tooth/teeth from: (Tick ONE box only)

- ☐ An information leaflet with just the basic information
- ☐ A booklet with detailed information
- ☐ A summary letter from the dentist after my child's appointment
- ☐ A "Do's and Don'ts" sheet
- ☐ In a book from the library
- ☐ I would not want to read any written information
- ☐ Other (please say what)

8. Sometimes we give patients and their parents written information about their dental treatment, **why do you think written information is important?** (Tick as many boxes as you want)

!



Version:2 (10/02/2014)

- ☐ Written information would not be useful as it would not be written specifically about my child's own teeth
- ☐ It would remind me what the dentist said
- ☐ It would tell me what to do if my child, or anyone else, damaged their teeth in the future
- ☐ It would give me the chance to understand the information prior to my child's next dental visit
- ☐ It would help in reassuring me about my child's damaged tooth/teeth
- ☐ Other (please say what).....

9. What do you think would be important to be included in written information leaflet? (Tick as many boxes as you want)

- ☐ Photographs of what might happen to the teeth
- ☐ Cartoon pictures of what might happen to the teeth
- ☐ A mix of photographs and cartoon pictures can be included showing what might happen to the teeth
- ☐ A picture of a damaged teeth on the front page
- ☐ The written information to be arranged in bullet points
- ☐ To have information given as questions and answers
- ☐ To include other patients' stories and experiences
- ☐ To include emergency contact numbers
- ☐ To be printed in colour
- ☐ To be sent with the appointment card for the first appointment
- ☐ To have an empty space at the back of the leaflet to write any questions or comments for the dentist
- ☐ Different written information sheets specific to the type of tooth/teeth damage my child had
- ☐ To be available at schools and have a list of the nearby emergency dentists
- ☐ Other (please say what).....

Part 5- What about providing information about damaged tooth/teeth on the Internet?

10. How often do you use the internet? (Tick ONE box only)

- ☐ Every day
- ☐ A few times a week
- ☐ A few times a month
- ☐ I do not use the internet at all

!



11. If you use the internet, what do you usually use it for? (Tick as many boxes as you want)

- ☐ Checking the news
- ☐ Looking for health-related information
- ☐ Facebook and social networking
- ☐ Online shopping
- ☐ Work
- ☐ Research
- ☐ Email
- ☐ Other (please say what).....

12. Which website would you use/have you used to look for information about your child's damaged tooth/teeth? (Tick as many boxes as you want)

- ☐ None
- ☐ Google
- ☐ Wikipedia
- ☐ Facebook
- ☐ YouTube
- ☐ NHS website/NHS direct
- ☐ Boots website
- ☐ Forums (e.g. teeth related forums)
- ☐ Mailing group for information regarding damaged teeth
- ☐ Other (please say which).....

13. Which words or "search terms" would you use to search for information about damaged teeth?

.....

.....

.....

14. Once you have put in your search terms, how would you choose which websites to get information from (Tick as many boxes as you want)

- ☐ I would check the first couple of websites
- ☐ I would look at one website then look for similarities in other websites
- ☐ A website that links to NHS or NHS direct pages
- ☐ A websites that ends with .gov
- ☐ A websites that links to a national Dental Association

Version:2 (10/02/2014)

- ☐ I would chose websites that link to (the) international Dental Association(s)
- ☐ I would chose a website that links to the Eastman Dental Hospital
- ☐ I would try to avoid websites for private dentists
- ☐ Other (please say which).....

15. Have you ever looked for videos on the Internet to find out what somebody should do if they damage their tooth/teeth (e.g. YouTube)? (Tick **ONE** box only)

- ☐ Yes, even before my child's teeth were damaged
- ☐ Yes, but only after my child's teeth were damaged
- ☐ No

16. Regarding internet videos, please look at the following statements and tick those that apply to you (Tick **as many** boxes as you want):

- ☐ I would not want to watch videos about damaged teeth
- ☐ I would prefer watching a video about damaged teeth than getting the information by asking other people.
- ☐ Watching a video following my child's dental appointments would help me to remember what the dentist said about the damaged teeth
- ☐ I would like to watch a video about what might happen to the damaged teeth
- ☐ I would like to watch a video about the treatment options for the damaged teeth
- ☐ I would watch a video showing me what I should do if someone damaged their teeth
- ☐ Other

17. Would you use a phone application "APP" about damaged tooth/teeth? (Tick **as many** boxes as you want)

- ☐ No, I would not use an "app" about damaged teeth
- ☐ I would download an "APP" specifically about damaged teeth
- ☐ I would download it only if the information regarding damaged teeth was incorporated with other general important and useful information
- ☐ I would download it only if it was in an application regarding trauma to different parts of the body including teeth
- ☐ I would only look at the "app" if it was free

!



Part 6- A little bit about Television, radio, newspapers, etc.

18. Would you be interested in watching television shows/adverts regarding damaged teeth? (Tick **ONE** box only)

- ☐ Yes, I would have been interested in that even before my child's teeth were damaged
- ☐ Yes, but only after my child's teeth were damaged
- ☐ No, I would not

19. Would you listen to a radio programme/advert regarding damaged teeth? (Tick **ONE** box only)

- ☐ Yes, I would have been interested in that even before my child's teeth were damaged
- ☐ Yes, but only after my child's teeth were damaged
- ☐ No, I would not

20. Would you read an article in a newspaper or magazine about damaged tooth/teeth? (Tick **ONE** box only)

- ☐ Yes, I would have been interested in that even before my child's teeth were damaged
- ☐ Yes, but only after my child's teeth were damaged
- ☐ No, I would not want to read an article about damaged teeth

Part 7- Tell us about the way you like information to be given to you

21. If you could choose **only one** method to be given information about your child's damaged tooth/teeth, which would you choose: (Tick **ONE** box only)

- ☐ Verbal information
- ☐ Written information
- ☐ Internet (including websites/video/applications)
- ☐ Media (TV/Radio/ Magazine/Newspapers)
- ☐ Other (please say what).....

Part 8- Almost finished! Just the last two questions

22. How can we make other people aware of what to do if somebody damages their teeth? (Tick as many boxes as you want)

- ☐ I do not think it is important to let anyone know unless it happened
- ☐ Dentists should visit schools to explain to children what to do if a child damages their teeth
- ☐ Posters in public places (e.g. on public transport)
- ☐ Posters in sports places (e.g. swimming pools)
- ☐ TV adverts and programmes
- ☐ Radio adverts and programme
- ☐ Magazine or newspaper articles
- ☐ By giving school teachers special training about what to do if a child damages their teeth
- ☐ By teaching those who run sport clubs what to do if a child damages their teeth
- ☐ Information in dentists' waiting rooms (posters, information leaflets, videos etc.)
- ☐ Information in Doctors' waiting rooms (posters, information leaflets, videos etc.)
- ☐ Information in hospital waiting rooms (posters, information leaflets etc.)
- ☐ Information in sports clubs (posters, information leaflets etc.)
- ☐ Information given at after school clubs
- ☐ Publicity campaigns in schools
- ☐ A video to show people what to do if their tooth was damaged
- ☐ A youth bus that travels to different places to educate young people
- ☐ Well-known sports role models could advertise the importance of wearing mouth guards for sports
- ☐ NHS direct phone lines to guide parents and patients where to go or what to do if trauma happens
- ☐ Other (please say what).....

22. Is there anything else you want to tell us about regarding your child's damaged tooth/teeth?

Thank you **very much** for filling in this questionnaire...

Appendix 14 Patients' information leaflet for phase II

Contact details

Dr Susan Parekh; Professor Susan Cunningham; Dr Adele Johnson; Mrs Nada Bamashmous.

Tel: 020 3456 1022
Fax: 020 3456 2329
Unit of Paediatric Dentistry
The Eastman Dental Hospital
256 Gray's Inn Road
London
WC1X 8LD
s.parekh@ucl.ac.uk
Website: www.uclh.nhs.uk

UCL Hospitals cannot accept responsibility for information provided by external organisations.



If you need a large print, audio or translated copy of this document, please contact us on (020)3456 1023. We will try our best to meet your needs.

If you wish to discuss this study with a member of the research team or an independent expert who is not part of the research team, please ask Dr Susan Parekh

Thank you for taking the time to read this leaflet.

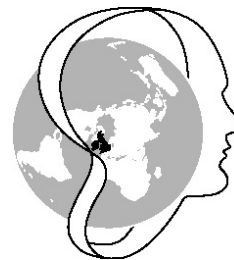
Publication date:
Date last reviewed:
Version number: 1

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University College London Hospitals 
NHS Foundation Trust

Information seeking behaviour patterns of dental trauma patients and their parents.

Patient's Information Leaflet
Questionnaire



Version:1

Date: 22-10-2013

Invitation

You are invited to take part in this research study. Before you make a decision, it is important that you know why the research is being done and what you will be asked to do. Please take time to read the following information carefully and discuss it with others if you wish. Please do ask if there is anything that is not clear or if you want like more information.

What is the purpose of the study?

Dental trauma (damage to teeth) in children and adolescents is a common problem worldwide. However, people do not know much about this and do not know what to do if it happens and what treatment possibilities are available. There is currently little information about what patients would like, if this happens to them. In this research, we want to find out what type of information patients and parents, carers or guardians want to know and, where do they look for this information and why.

Why have I been invited?

This study is interested in patients who have injured their teeth and we are looking for all patients who have had these types of injuries.

Do I have to take part?

The decision to take part is optional and it is entirely up to you. If you change your mind, or feel slightly distressed (by talking about your experiences of dental trauma) you are free to withdraw from the discussion at any time,

without giving a reason. The standard of care you receive will not be affected in any way.

What will happen to me if I take part?

We will ask you to fill a questionnaire including questions about what types of information you would like to know about dental injuries to the teeth, and where you might look for this information. This should only take about 5-10 minutes. There are no right or wrong answers; we are just interested in your ideas. This questionnaire will be filled by large number of patients and we then hope to be able to improve the information which we make available to patients and their parents. You will not need to do anything else.

What are the possible disadvantages or risks of taking part?

There are no risks anticipated. None of your answers will affect your treatment in any way.

What are the possible benefits?

We cannot promise the study will help you directly but the information we get from this study will help us to provide better information about dental trauma.

What will happen with the results?

We hope to publish the results of the study on completion. All confidential information will be coded and you will not be identifiable in any way.

Will my taking part in the study remain confidential?

Yes. All information collected from you during the research will remain strictly confidential and will be seen only by the investigators named on this sheet. The safety and security of the data will be the responsibility of the principal investigator (Dr Susan Parekh). The data held about you will include the information from the interview and also your gender (male or female). This information will be recorded in such a way that it is completely anonymous and you will not be individually identified in anyway.

Who has reviewed the study?

All researches in the NHS are looked at by independent group, called a Research Ethics Committee to protect your safety, rights, wellbeing and dignity. This study has been reviewed by NRES Committee North East Newcastle and North Tyneside 1) Research Ethics Proportionate Review Sub-Committee. If you would like to see a summary of the findings from the study when it is completed, please tell Dr Parekh or any of the other dentists you see.

Version: 1

Date: 22-10-2013

Appendix 15 Parents' information leaflet for phase II

Contact details

Dr Susan Parekh; Professor Susan Cunningham; Dr Adele Johnson; Mrs Nada Bamashmous.

Tel: 020 3456 1022

Fax: 020 3456 2329

Unit of Paediatric Dentistry
The Eastman Dental Hospital
256 Gray's Inn Road

London

WC1X 8LD

s.parekh@ucl.ac.uk

Website: www.uclh.nhs.uk

UCL Hospitals cannot accept responsibility for information provided by external organisations.



If you need a large print, audio or translated copy of this document, please contact us on (020)3456 1023. We will try our best to meet your needs.

If you wish to discuss this study with a member of the research team or an independent expert who is not part of the research team, please contact Dr Susan Parekh

Thank you for taking the time to read this leaflet.

Publication date:
Date last reviewed:
Version number: 1

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University College London Hospitals NHS Foundation Trust

Information seeking behaviour in dental trauma patients and their parents.

Parent's Information Leaflet
Questionnaire



Version: 1

Date: 22-10-2013

Invitation

You and your child are being invited to participate in this research study. Before you make a decision, it is important that you know why the research is being done and what you will be asked to do. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the study?

Dental trauma (damage to teeth) in children and adolescents is a common problem worldwide. However, people do not know much about this and do not know what to do if it happens to their child and what treatment possibilities are available. There is currently little information about what patients would like, if this happens to them. In this research, we want to find out what type of information patients and parents, carers or guardians want to know and, where and why they might look for this information.

Why has my child been chosen?

This study is interested in patients who have injured their teeth and we are looking for all patients who have had these types of injuries.

Does my child have to take part?

The decision to take part is optional and it is entirely up to you and your child. If you decided to take part, you will be asked to sign a consent form for your own and your child's participation). If you change your mind, or

feel slightly distressed (by talking about your experiences of dental trauma) you are free to withdraw at any time, without giving a reason. The standard of care you receive will not be affected in any way.

What will happen to me and my child if we took part?

We will ask you to fill a questionnaire that include some questions about what types of information you would like to know about dental injuries to the teeth and where you might look for this information. This should only take about 5-10 minutes. There are no right or wrong answers; we are just interested in your ideas. This questionnaire will be distributed to a large number of patients and we then hope to be able to improve the information which we make available to patients and their parents. You will not need to do anything else.

What are the possible disadvantages or risks of taking part?

There are no risks anticipated. None of you and your child's answers will affect your child's treatment in any way.

What are the possible benefits?

We cannot promise the study will help you directly but the information we get from this study will help us to provide better information about dental trauma.

What will happen with the results?

We hope to publish the results of the study on completion. All confidential information will be coded and you will not

be identifiable in any way.

Will my taking part in the study remain confidential?

Yes. All information collected from you and your child during the research will remain strictly confidential and will be seen only by the investigators named on this sheet. The safety and security of the data will be the responsibility of the principal investigator (Dr Susan Parekh). The data held about you and your child will include the information from the interview and also your and your child's gender (male or female). This information will be recorded in such a way that it is completely anonymous and neither you nor your child will be individually identified in any way.

Who has reviewed the study?

All researches in the NHS are looked at by independent group, called a Research Ethics Committee to protect your safety, rights, wellbeing and dignity. This study has been reviewed by NRES Committee North East Newcastle and North Tyneside 1) Research Ethics Proportionate Review Sub-Committee. If you would like to see a summary of the findings from the study when it is completed, please tell Dr Parekh or any of the other dentists you see.

Version: 1

Date: 22-10-2013

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Dr Susan Parekh 020-3456-1022

Researcher (to be contacted if there are any problems)

Comments or concerns during the study

If you have any comments or concerns you may discuss these with the investigator. If you wish to go further and complain about any aspect of the way you have been approached or treated during the course of the study, you should write or get in touch with the Complaints Manager, UCL Hospitals. Please quote the reference number at the top this consent form.

1 form for patient,
1 to be kept as part of the study documentation,
1 to be kept with hospital notes.

Appendix 17 Parents' consent form for phase II

University College London Hospitals **NHS**

NHS Foundation Trust

The Eastman Dental Hospital
Department of Paediatric Dentistry
 256 Gray's Inn Road
 London
 WC1X 8LD

Reception: 020 345 61097/61023
Office: 020 345 61273
Fax: 020 345 62329

Web-site: www.uclh.nhs.uk
 22/10/13

Patient Identification Number for this study:
 Form version:1
 REC Ref No: 12/NE/0194

CONSENT FORM FOR PARENTS / GUARDIANS FOR THEIR PARTICIPATION

TITLE: Information seeking behaviour in dental trauma patients and their parents'

Name of Principal Investigators: Dr Susan Parekh; Professor Susan Cunningham; Dr Adele Johnson; Mrs. Nada Bamashmous'

- ! ! ! ! ! ! ! ! ! ! ! Please tick/initial box!
1. ! ! confirm! that! ! have! read! and! understood! the! information! sheet! ! ☐
 (Version! 1! dated! 22-10-2013)! for! the! above! study! and! have! had! the!
 opportunity! to! ask! questions.!
- ! ! ☐
2. ! ! confirm! that! ! have! had! sufficient! time! to! consider! whether! or! not! !
 wish! to! be! included! in! the! study.!! ☐
- ! ! ☐
3. ! ! understand! that! my! participation! is! voluntary! and! that! ! am! free! to! !
 withdraw! at! any! time,! without! giving! any! reason,! without! my! child's!
 medical! care! or! legal! rights! being! affected.!
- ! ! ☐
4. ! ! understand! that! relevant! sections! of! my! child's! medical! notes! and! data! !
 collected! during! the! study! may! be! looked! at! by! individuals! from! [UCL!
 Eastman! Dental! Institute],! from! regulatory! authorities! or! from! the! NHS!
 Trust,! where! it! is! relevant! to! my! taking! part! in! research.!! ! ! give!
 permission! for! these! individuals! to! have! access! to! my! child's! records.!
- ! ! ☐
5. ! ! I agree! to! take! part! in! the! above! study.!
- ! ! ☐
- ! !
- !

 Name of parent/guardian/carer' "Date" "Signature of parent"

 Name of Person taking consent' Date' Signature'



UCL Hospitals is an NHS Trust incorporating the Eastman Dental Hospital, Elizabeth Garrett Anderson & Obstetric Hospital, The Heart Hospital, Hospital for Tropical Diseases, The Middlesex Hospital, National Hospital for Neurology & Neurosurgery, The Royal London Homoeopathic Hospital and University College Hospital.

Dr Susan Parekh 020-3456-1022

Researcher (to be contacted if there are any problems)

Comments or concerns during the study

If you have any comments or concerns you may discuss these with the investigator. If you wish to go further and complain about any aspect of the way you have been approached or treated during the course of the study, you should write or get in touch with the Complaints Manager, UCL Hospitals. Please quote the reference number at the top this consent form.

1 form for patient,
1 to be kept as part of the study documentation,
1 to be kept with hospital notes.

Appendix 18 Parents' consent form for their child participation in phase II

University College London Hospitals **NHS**

NHS Foundation Trust

The Eastman Dental Hospital
Department of Paediatric Dentistry
256 Gray's Inn Road
London
WC1X 8LD

Reception: 020 345 61097/61023
Office: 020 345 61273
Fax: 020 345 62329

Web-site: www.uclh.nhs.uk
22/10/13

Patient Identification Number for this study:
Form version:1
REC Ref No: 12/NE/0194

CONSENT FORM FOR PARENTS / GUARDIANS FOR THEIR CHILD PARTICIPATION

TITLE: Information seeking behaviour in dental trauma patients and their parents!
Name of Principal Investigator: Dr Susan Parekh; Professor Susan Cunningham; Dr Adele Johnson; Mrs. Nada Bamashmous!

! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! Please tick/initial box!

1. I confirm that I have read and understood the information sheet!
(Version 1 dated 22-10-2013) for the above study and have had the
opportunity to ask questions. ☐

2. I confirm that I have had sufficient time to consider whether or not I
wish my child to be included in the study. ☐

3. I understand that my child's participation is voluntary and that he/she is
free to withdraw at any time, without giving any reason, without my
child's medical care or legal rights being affected. ☐

4. I understand that relevant sections of my child's medical notes and data
collected during the study may be looked at by individuals from [UCL
Eastman Dental Institute], from regulatory authorities or from the NHS
Trust, where it is relevant to my taking part in research. I give
permission for these individuals to have access to my child's records. ☐

5. I agree for my child to take part in the above study. ☐

Name of parent/guardian/carer: _____ Date: _____ Signature of parent: _____

Name of Person taking consent: _____ Date: _____ Signature: _____



UCL Hospitals is an NHS Trust incorporating the Eastman Dental Hospital, Elizabeth Garrett Anderson & Obstetric Hospital, The Heart Hospital, Hospital for Tropical Diseases, The Middlesex Hospital, National Hospital for Neurology & Neurosurgery, The Royal London Homoeopathic Hospital and University College Hospital.

Dr Susan Parekh 020-3456-1022

Researcher (to be contacted if there are any problems)

Comments or concerns during the study

If you have any comments or concerns you may discuss these with the investigator. If you wish to go further and complain about any aspect of the way you have been approached or treated during the course of the study, you should write or get in touch with the Complaints Manager, UCL Hospitals. Please quote the reference number at the top this consent form.

1 form for patient,
1 to be kept as part of the study documentation,
1 to be kept with hospital notes.



UCL Hospitals is an NHS Trust incorporating the Eastman Dental Hospital, Elizabeth Garrett Anderson & Obstetric Hospital, The Heart Hospital, Hospital for Tropical Diseases, The Middlesex Hospital, National Hospital for Neurology & Neurosurgery, The Royal London Homoeopathic Hospital and University College Hospital.

Appendix 19 Favourable opinion for phase II of the research



Health Research Authority

NRES Committee North East - Newcastle & North Tyneside 1

TEDCO Business Centre
Room 002
Rolling Mill Road
Jarrow
NE32 3DT

Tel: 0191 428 3384

18 March 2014

Dr Susan Parekh
Clinical Lecturer/ Honorary Consultant
University College London
Paediatric Department
UCL Eastman Dental Institute
256 Gray's Inn Road
WC1X8LD

Dear Dr Parekh

Study title:	Information seeking behaviour patterns of dental trauma patients and their parents, carers or guardians
REC reference:	12/NE/0194
Protocol number:	12/0110
Amendment number:	Substantial Amendment 1, 22/10/13
Amendment date:	21 February 2014
IRAS project ID:	99783

The above amendment was reviewed at the meeting of the Sub-Committee held on 14 March 2014 by the Sub-Committee in correspondence.

Ethical opinion

The members of the Committee taking part in the review gave a **favourable** ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Participant Information Sheet: Patients	1	22 October 2013
Questionnaire: Parent	2	10 February 2014
Notice of Substantial Amendment (non-CTIMPs)	Substantial Amendment 1, 22/10/13	21 February 2014
Questionnaire: Patient	2	10 February 2014
Participant Information Sheet: Parents	1	22 October 2013
Participant Consent Form: Patient	1	22 October 2013
Covering Letter	N. Bamashmous	

A Research Ethics Committee established by the Health Research Authority

Participant Consent Form: Parent CF for their children participation	1	22 October 2013
Participant Consent Form: Parent CF for their participation	1	22 October 2013

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

We are pleased to welcome researchers and R & D staff at our NRES committee members' training days – see details at <http://www.hra.nhs.uk/hra-training/>

12/NE/0194:	Please quote this number on all correspondence
--------------------	---

Yours sincerely
pp

Sarah Prothero

Professor Philip Preshaw
Chair

E-mail: nrescommittee.northeast-newcastleandnorthtyneside1@nhs.net

Enclosures: List of names and professions of members who took part in the review

Copy to: Mr Philip Diamond, UCL/University College Hospital London

NRES Committee North East - Newcastle & North Tyneside 1

**Attendance at Sub-Committee of the REC meeting on 14 March 2014 by
correspondence**

<i>Name</i>	<i>Profession</i>	<i>Capacity</i>
Professor Philip Preshaw (Chair)	Lecturer and Honorary SpR in Restorative Dentistry	Expert
Mrs Joan Bedlington	Charity Worker	Lay Plus

Also in attendance:

<i>Name</i>	<i>Position (or reason for attending)</i>
Miss Sarah Prothero	REC Assistant

Appendix 20 SPSS spreadsheet for patient's questionnaires

Please see CD enclosed for SPSS® spreadsheet for data acquired from patients' questionnaires.

Appendix 21 SPSS spreadsheet for parents' questionnaires

Please see CD enclosed for SPSS® spreadsheet for data acquired from parents' questionnaires.

Appendix 22 Excel spreadsheet for patients' questionnaires

Please see CD enclosed Microsoft® Excel spread sheet for data acquired from patients' questionnaires.

Appendix 23 Excel spreadsheet for parents' questionnaires

Please see CD enclosed for Microsoft® Excel spread sheet for data acquired from parents' questionnaires.

Appendix 24 List for verbal information to be provide to patients

Patient name:
Hospital ID:

Date:

Information to be provided to dental trauma patients:

- | | | |
|---|------------------------------|------------------------------|
| • Severity of trauma | <input type="checkbox"/> Yes | |
| • Long-term consequences | <input type="checkbox"/> Yes | |
| • Exact damage happened to the tooth | <input type="checkbox"/> Yes | |
| • Avoid biting hard food on the traumatised tooth | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A |
| • Possibility of colour change | <input type="checkbox"/> Yes | |
| • Timing for orthodontic treatment | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A |
| • If local anaesthetic would be required | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A |
| • The possibility of loosing the restoration | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A |
| • Possibility of vitality loss | <input type="checkbox"/> Yes | |

Appendix 25 Paragraph to be added to patients letters

Post-operative care instructions to be added to summary letters:

- In the first two weeks following trauma, your child should:
 - Use a soft diet
 - Avoid biting on hard foods on the damaged tooth
 - Use regular pain killers such as Paracetamol if required
 - Use a soft brush to brush the damaged teeth
 - Your dentist may prescribe a mouthwash for your child to use if toothbrushing is difficult
- It is advised that your child wears gum-shield whenever play contact sport
- Contact us or your local dentist if the tooth became painful, loose, discoloured or if your child started to have swelling in the gum or face or if you have any other concerns on:
Tel: (020)34561023/ 61097

Chapter Twelve

Audit

Compliance of the Eastman Paediatric
Dentistry Unit with the Caries Prevention
Advice provided by the Department of Health
toolkit: An audit

Nada Bamashmous

BDS MSc. MFDS (Edn)

Submitted to University College London (UCL)

In partial fulfilment of the requirements for the degree of

Clinical Doctorate in Paediatric Dentistry

UNIVERSITY COLLEGE LONDON

EASTMAN DENTAL INSTITUTE

July 2014



12 Compliance of the Eastman Paediatric Dentistry Unit with the Caries Prevention Advice provided by the Department of Health toolkit: An audit

12.1 Introduction

12.1.1 Dental caries

12.1.1.1 Definition and aetiology

Dental caries is defined as the localised destruction of susceptible dental hard tissues by the acidic by-products from bacterial fermentation of dietary carbohydrates (Fejerskov and Kidd, 2003). It describes both the caries process and the carious lesions formed secondary to that process (Fejerskov, 1997).

Dental decay forms due to the dynamic interaction between the naturally occurring biofilm (plaque) and its bacteria with the tooth structure. Dental caries can only progress when the balance between demineralisation and remineralisation become disturbed, where demineralisation becomes greater and lasts for a longer period and loss of enamel structure takes place (Welbury *et al.*, 2013; Evans and Innes, 2010).

From understanding the process of caries, we know that the cariogenic potential of plaque can be altered by changing the environment including carbohydrates and PH, therefore prevention is the key.

12.1.1.2 Prevalence

Dental Caries is one of the most common chronic diseases affecting human beings. Many epidemiological studies have been conducted world wide to understand its extent, distribution, possible associated risk factors and extent for the need of treatment. In the United Kingdom, caries epidemiological studies have been conducted in three main age groups: below 3-years old, 5-years old and 12-years old.

In 2001, Davies and colleagues conducted a survey to measure the prevalence of dental decay among 3-years old children living in Manchester city. They found that the prevalence of dental caries among this age group was 32% with mean dmft (decayed missing filled teeth) score of 1.4 (Davies *et al.*, 2001).

For the other age groups, series of nationally coordinated surveys of child dental health have been conducted since 1973. The data from these surveys were taken from different regions of the UK and produced a robust and comparable database. The NHS Dental Epidemiology Programme and the British Association for the Study of Community Dentistry have been running these surveys. The last published surveys were in 2011-2012 for five-years old children and 2008-2009 for twelve-years old children. Prevalence of dental caries among children living in England was found to be 27.9% for the five years old group and 33.4% for the twelve years old children (NHS Dental Epidemiology Programme for England, 2012; NHS Dental Epidemiology Programme for England, 2010).

Dental health in the UK has improved significantly over the last few decades. For the period between 1973 and 1993, a rapid decline in caries experience was observed in the 12 years age group, where the percentage dropped from over 80% to 20% per cent and continued a gradual decrease until 2008 to reach just over 10% (NHS Dental Epidemiology Programme for England, 2010). In Scotland, the percentage of caries free children increased from 42% in 1988 to 73% in 2013 (NHS National Services Scotland, 2013).

12.1.1.3 Caries risk assessment

Caries risk assessment for individual patients can be done using a variety of predictors including: dietary factors especially sugary food and drinks, oral hygiene habits, microbiological risk factors, salivary status, socio-demographic background, medical history, uses of fluoride and previous caries experience. Risk assessment is the dentists responsibility based on the clinical judgment on their knowledge of the patient and using these risk predictors.

Socio-demographic risk factors

Previous studies looked in different possible socio-demographic predictors that might have an influence on the prevalence of dental caries on children. Authors concluded that the prevalence of caries is higher in infants and older children of a low socioeconomic status when compared to more affluent areas (Radford *et al.*, 2000; Disney *et al.*, 1992). Groups of studies investigated the association between low-birth weight and caries development. A systematic review showed no association, however, some reports showed high prevalence of enamel defects associated with

children born with lower birth weight which could be associated with higher prevalence of caries in this group of children (Burt and Pai, 2001; Lai *et al.*, 1997).

Medical History

Medical history has a significant effect on childrens oral health and in some patients, dental treatment can be difficult or have major effect on their general health. It is one of the fundamentals to be aware of these patients and to deal with them as high caries risk group by implying an intensive preventive plan to prevent caries occurrence (SIGN, 2014).

Previous caries experience

Previous reports indicted that children who suffered from caries in the past are more likely to have caries in the future. Evidence from 4 cohort studies showed that children with previous history of dental caries were at high risk of developing new leasions and have more extensive type of decay (Wandera *et al.*, 2000, Wendt *et al.*, 1999; Saemundsson *et al.*, 1997; Grindejford *et al.*, 1995). Group of reports were conducted to investigate different caries risk predictors and their interaction together and they concluded that the most important predictors for caries in younger children are previous caries experience and the presence of Mutans streptococci in high level (Habibian *et al.*, 2002; Wandera *et al.*, 2000; Grindejford *et al.*, 1995; Disney *et al.*, 1992).

Saliva

Salivary secretion plays a major role in teeth protection against caries (Stookey, 2008). Factors such as salivary flow rate, buffering capacity and antimicrobial effect are important salivary functions especially to protect the integrity of teeth. Reduction in the flow rate in children is rare and can be due to the absence of one or more of the major salivary glands, presence of medical condition associated with reduction of salivary flow or related to drugs used to treat these conditions. This reduction increase the risk of caries development in the affected children, however, using salivary flow as risk marker proved to be not helpful (Cunha-Cruz *et al.*, 2013; Sanchez-Perez *et al.*, 2009).

Microbiological risk factors

Previous studies investigated the bacteria associated with caries formation. They found that that caries in young children is mainly associated associated with the presence of high oral levels of mutans streptococci (Barsamian-Wunsch et al., 2004; Thibodeau and O'Sullivan, 1999). Investigating the presence of these bacteria in the child saliva sample in higher level would indicate higher risk of caries development. However these tests are not predictable and at present they do not appear to offer significant benefit over previous caries experience (SDCEP, 2012)

Caries risk assessment tools

As discussed earlier, different caries predictors are available to support the clinician in determining the caries risk, and the majority are not reliable or not applicable for everyday use. It has been reported that there is a need to develop a handy caries risk assessment tool or risk model for pre-school children (MacRitchie *et al.*, 2012). Group of dental associations developed cries assessment tools such as Dundee Caries Risk Assessment Model (DCRAM), Caries Management by Risk Assessment (CAMBRA), American Dental Association (ADA). However, there was no published evidence to show the effectiveness of these tools (Tellez *et al.*, 2013). The Department of Health recommended using previous caries risk experience as a tool for risk assessment in their toolkit (Department of Health, 2009), therefore, it was used for to indicated the level of risk for children on this audit.

12.1.1.4 Prevention

All children are at risk of developing dental decay, some are at increased risk and other at a lower risk, therefore, preventive intervention is required according to their level of caries risk.

Prevention can be in two forms: patient advice and preventive treatments. The former includes proper oral hygiene instructions (jncluding appropriate fluoride toothpaste levels) and diet advice while the latter includes fluoride varnish application, application of fissure sealants and professional removal of plaque and calculus (SDCEP, 2012). Each one of these methods will be discussed in detail.

Oral hygiene instructions

Teeth brushing

Major oral problems including caries and periodontal disease can both be controlled by regular tooth brushing. Brushing serves as a media to deliver the fluoride from the toothpaste to help controlling dental decay, while the physical movement of the brush assist in removal of the plaque layer and massaging the gingivae which in turn reduces the inflammatory response in its sequelae (DH, 2009). Available evidence suggests the use of following principles to maximise the effect of tooth brushing.

Use of fluoridated toothpaste

The use of fluoridated toothpaste shows significant results in reduction of caries formation. Several systematic reviews have showed decrease in caries development with the increase if fluoride concentration in increased baseline caries levels (Santos *et al.*, 2013; Walsh *et al.*, 2010; Wong *et al.*, 2010; Twetman, 2009; Twetman-1, 2008; Steiner *et al.*, 2004; Marinho *et al.*, 2003; Marinho *et al.*-1 2003; Twetman *et al.*, 2003). One meta-analysis investigated the effect of the use of 1000-1500 ppmF toothpaste compared of the use of non-fluoridated toothpaste or no use of toothpaste on children primary dentition. Results showed significant reduction in caries experience in the fluoridated toothpastes group compared to the other groups by a fraction of 31% (Santos *et al.*, 2013). Another systematic review looked in the same intervention but in permanent dentition and reported 25% caries reduction in the Fluoridated toothpaste group (Twetman *et al.*, 2003).

Recommendations regarding the correct amount and concentration of Fluoride toothpaste should be used according to the age and weight of the child to balance between the benefits of caries prevention and the risk of development of dental fluorosis. Therefore, it has been recommended that the parents should provide their children with the recommended amount of toothpaste in this particular age group (SIGN, 2014). The amount of toothpaste for younger than 3 years old children should not exceed a smear of toothpaste on the small brush. For children older than 3 years of age, it is recommended to use a pea-size amount of the toothpaste (SDCEF, 2010).

Different fluoride concentration available to be used and recommendations are available for each age group. The maximum allowed Fluoride concentration over the counter is 1500 ppmF (The Cosmetic Products (Safety) Regulations, 2008). For children younger than 3 years, it is recommended not to use toothpaste of Fluoride concentration more than 1000 ppmF to avoid risk of Fluorosis. For patients over 3

years of age, they can use toothpastes with Fluoride concentration of 1350-1500 ppmF (Department of health, 2009) . One systematic review compared the effect of using 1000 ppmF and 1500 ppmF toothpastes. The found an extra 9.7% reduction of caries in the higher concentrated toothpaste group (Twetman *et al.*, 2003).

In specific situations, dentists can prescribe patients with higher concentrated toothpastes including those with 2800 and 5000 ppmF toothpastes. Toothpastes with 2,800 ppmF can be provided to patients aged 10 years old while 5,000 ppmF can only be prescribed to patients aged 16 years and above with high caries risk (DH, 2009)

Frequency

Evidence from a Cochrane review showed higher effect of the fluoride in the toothpaste with increase in the frequency of teeth brushing. They concluded that the DMFT was reduced by 14% when they compared the effect of tooth brushing once or twice daily (Marinho *et al.*-1 2003). In addition, most studies done following this systematic review which were conducted to find the effect of frequency of brushing and caries reduction showed a significantly greater reduction in caries incidence with brushing at least twice daily compared with less than twice daily (Pakpour *et al.*, 2011; Liu Hy *et al.*, 2010; Senesombath *et al.*, 2010; Jerkovic *et al.*, 2009; Maserejian *et al.*, 2009; Molina-Frecherro *et al.*, 2009; vazquez-Nava *et al.*, 2008; Levine *et al.*, 2007; Lillehagen *et al.*, 2007; Martens *et al.*, 2006).

Duration

Recommendations from the Scottish Clinical Effectiveness programme were provided to brush for at least 2 minutes, however, no evidence is curently present to show the effect of the duration of teeth brushing and reduction of dental caries (SDCEP, 2010).

Timing of toothbrushing

With the fact that salivary flow reduce during sleep, brushing the teeth at night showed to increase the availability of Fluoride in high levels and help reducing the carious activity (Davies *et al.*, 2003). It was found that toothbrushing prior to sleep would ensure keeping the Fluoride level high even after 12 hours (Duckworth and Moore, 2001)

Supervision

An evidence from Cochrane review indicated that supervising children brushing their dentition would result in 10% extra reduction of caries prevalence besides the use of Fluoridated toothpaste when compared to children who brush their teeth without supervision (Marinho *et al.*-1 2003). It was also reported that supervising children brushing practice is important as parents can control the amount of the toothpaste applied and prevent the risk of toothpaste ingestion and risk of Fluorosis (Davies *et al.*, 2003). The Department of health recommendations stated that the parents should brush their children's teeth until the age of 3 and should supervise them until age of 6 (DH, 2009).

Age of brushing

Recommendations from several studies and reviews highlighted the importance of brushing as soon as the teeth erupt. It was reported that the caries prevention proportion increases if the teeth brushing was established at a younger age. In this study, 88% of the children who started brushing their teeth within their first year remained caries free; while only 81% of those who started brushing in their second year of life and 61% of those with over two years remained caries free (Hinds *et al.*, 1995). The Department of health suggested brushing children teeth as soon as they erupt twice daily (DH, 2009).

Post brushing rinsing

It was reported that avoiding rinsing the mouth with water and eating following teeth brushing would result in increasing the availability of the Fluoride in the mouth. This increase showed to help reduction in the number of proximal lesions of children by 26% (Sjogren *et al.*, 1995). Department of health and the SIGN guidelines discouraged the additional rinsing of the mouth with water following brushing (SIGN, 2014; DH, 2009).

Use of fluoride mouthwashes

An evidence from a Cochrane review showed that daily use of sodium Fluoride mouthwash helps in reducing the severity of enamel caries (Benson *et al.*, 2004), however, this effect appeared to be more with the absence of the use of toothpaste

(SIGN, 2014). The Department of Health recommended the use of Fluoride mouthwashes for those aged above 6 years old at a different time of brushing when they are at a higher risk of caries development (DH, 2009)

Flossing

The available evidence from a systematic review regarding the effectiveness of using floss in addition to brushing in caries reduction in children is of insufficient quality and high presence of bias in the trials to draw a recommendation from them (Hujuel *et al.*, 2006).

Diet advice

Diet advice should be provided to all children especially for those below age of five, as diet is the main cause of rampant caries in this age group. Several advices were recommended to be provided to patients by the Department of health, which would decrease the chance of caries development. These include: reduction the frequency of exposure to sugary food and drinks and to limit the sugar consumption to mealtime and not more than 4 times a day (DH, 2009).

Topical fluoride varnish

Many reports had been done to investigate the possible effect of Fluoride varnish in preventing dental decay in different countries. Some of these studies were inconclusive and the level of evidence varied. Group of systematic reviews were therefore conducted including meta-analysis to establish a robust evidence regarding the true value of Fluoride varnish effect.

The latest systematic review involved 22 previous studies looked on the caries prevention effect of F⁻ varnish on permanent and primary dentition and conducted meta-analysis to investigate the size of the F-varnish effect in different types of dentition. They identified 13 trials looking on the effect on permanent dentition and the meta-analysis of the effect reported a 43% preventive fraction when compared with controlled (placebo) group. For primary dentition, 10 articles were included and the meta-analysis reported a preventive fraction of 37% (Marinho *et al.*, 2013).

Most of the available literature suggests Fluoride application twice yearly and only few studies suggested application up to four times a year. A meta analysis was also done to compare the preventive fraction of using fluoride varnish in different

frequencies yearly and the concluded that there was no significant difference in applying F-varnish twice yearly compared to four times yearly in both permanent and primary dentition (Azarpazhooh and Main, 2008)

Recommendation to apply Fluoride varnish at least twice a year in all children and to increase its application up to 4 times a year in children with high caries risk (DH, 2009).

Fissure sealant

Fissure sealants are defined as “a protective plastic coating which is applied by a dentist to the biting surfaces of the back teeth, forming a hard shield that keeps food and bacteria from getting into the tiny grooves in the teeth and causing decay”(SIGN, 2014). They have been commonly used world wide for the past 50 years. Two different types of sealant are available: resin-based and glass ionomer-based fissure sealants. Resin-based are most commonly used.

Evidence from Cochrane review investigated the effect of using different types of fissure sealant when compared to no treatment in preventing caries in children and adolescent. Only 27% of children who had fissure sealant developed caries in 9 years follow-up period compared to 77% of children who did not have fissure sealant placed. Fissure sealant reported to show high retention rate where 90% of them stayed after 1 year, 8% after two years and 70% after 48-54 months of their placement (Ahovuo-Saloranta *et al.*, 2013).

The new published guidelines from SIGN stated that all children should have resin-based fissure sealant as soon as their first molars erupt (SIGN, 2014).

12.1.2 Department of Health tool kit

Delivering Better Oral Health (DH, 2009) is an evidence based toolkit made to provide a guidance to the whole dental team regarding the advice to should provide the patients with, and what they should do as professionals to prevent the occurrence of dental decay. It has been produced by the Department of Health and the British Association for the Study Community Dentistry (BASCD). In 2005, the Department of Health suggested that the primary care trusts should provide an evidence based service which is mainly focussed on prevention of oral disease and commissioned the BASCD to lead the work and finally published the first edition in 2007.

The first edition was originally published in September 2007 with simple important messages regarding caries prevention on children. An updated second version was published in 2009 delivering the same fundamental messages but with updated lists of fluoride contents of toothpastes and sugar-free medicine. It also included an update to the dietary and alcohol sections.

The document includes different chapters starting with an introduction regarding how they categorised the evidence, which will be used in the document. This was followed by handy tables summarising the key points of the document according to different age groups for different oral diseases including caries, periodontal diseases and oral cancer. Then, detailed information provided for different preventive methods in separate chapter such as principles of toothbrushing, increasing fluoride availability and healthy eating advice. A more recent edition was published in 2014 after starting this finishing data collection for the current audit; therefore, the recommendations from the second edition of the toolkit were used as standards for this audit.

Following the recent thinking in dentistry moving toward caries prevention, this toolkit provide not only the high-risk patient with the advice but also include those with low caries risk with the appropriate changes in these advices. It provides recommendations for caries prevention according to the caries risk and age of the children. Caries risk assessment was made easy to be determined, where people with positive medical history, signs of active caries or those where reparative treatment is not possible are considered a high risk group. Those recommendations are summarised in Table 12-1, Table 12-2 and Table 12-3 (DH, 2009).

	Advice to be given	EB	Professional intervention
Children aged up to 3 years	• Breast feeding provides the best nutrition for babies	I	
	• From six months of age infants should be introduced to drinking from a cup, and from age one year feeding from a bottle should be discouraged	III	
	• Sugar should not be added to weaning foods	V	
	• Parents should brush or supervise toothbrushing	V	
	• Use only a smear of toothpaste containing no less than 1,000 ppm fluoride	I	
	• As soon as teeth erupt in the mouth brush them twice daily	IV	
	• The frequency and amount of sugary food and drinks should be reduced and, when consumed, limited to mealtimes. Sugars should not be consumed more than four times per day	III	
	• Sugar-free medicines should be recommended	III	

Table 12-1 prevention of caries in children 0-3 years

	Advice to be given	EB	Professional intervention
All children aged 3–6 years	• Brush last thing at night and on one other occasion	I	• Apply fluoride varnish to teeth twice yearly (2.2% F)
	• Brushing should be supervised by an adult	V	
	• Use a pea-sized amount of toothpaste containing 1,350–1,500 ppm fluoride	V, I	
	• Spit out after brushing and do not rinse	IV	
	• The frequency and amount of sugary food and drinks should be reduced and, when consumed, limited to mealtimes. Sugars should not be consumed more than four times per day	III	
	• Sugar-free medicines should be recommended	III	
Children giving concern (eg those likely to develop caries, those with special needs)	All advice as above, plus:		<ul style="list-style-type: none"> • Apply fluoride varnish to teeth 3–4 times yearly (2.2% F) • Prescribe fluoride supplement and advise re maximising benefit • Reduce recall interval • Investigate diet and assist to adopt good dietary practice • Ensure medication is sugar free or given to minimise cariogenic effect
	• Use a smear or pea-sized amount of toothpaste containing 1,350–1,500 ppm fluoride	I	
	• Ensure medication is sugar free	V	
	• Give dietary supplements containing sugar and glucose polymers at mealtimes when possible (unless clinically directed otherwise) and not last thing at night. Parents should be made aware of the cariogenicity of supplements and ways of minimising risk	V	

Table 12-2 prevention of caries in children 3-6 years

	Advice	EB	Professional intervention
All children and young adults	<ul style="list-style-type: none"> • Brush twice daily • Brush last thing at night and on one other occasion • Use fluoridated toothpaste (1,350 ppm fluoride or above) • Spit out after brushing and do not rinse • The frequency and amount of sugary food and drinks should be reduced and, when consumed, limited to mealtimes. Sugars should not be consumed more than four times per day 	I V I IV III	<ul style="list-style-type: none"> • Apply fluoride varnish to teeth twice yearly (2.2% F⁻)
Those giving concern (eg those likely to develop caries, those undergoing orthodontic treatment, those with special needs)	All the above, plus: <ul style="list-style-type: none"> • Use a fluoride mouthrinse daily (0.05% NaF) at a different time to brushing • Consider recommending an oscillating/rotating power toothbrush 	I I	<ul style="list-style-type: none"> • Fissure seal permanent molars with resin sealant • Apply fluoride varnish to teeth 3–4 times yearly (2.2% F⁻) • For those 8+ years with active caries prescribe daily fluoride rinse • For those 10+ years with active caries prescribe 2,800 ppm toothpaste • For those 16+ years with active disease consider prescription of 5,000 ppm toothpaste • Investigate diet and assist adoption of good dietary practice

Table 12-3 Prevention of caries in children over 6 years

Recently, health care became more patient-centred; involving patients during the entire course of treatment and giving them more responsibility for the after-care. Providing patients and their parents with caries prevention advice is very important as caries is considered preventable disease. It is also important to have full documentation regarding information provided on the patient's notes for medico-legal purposes especially in cases of neglect. Therefore, it was important to assess the reported compliance of the department of paediatric dentistry at the Eastman Dental Hospital to the advice provided by the Department of Health toolkit.

12.2 Aim and Standards

12.2.1 Aims and objectives

The overall aim of this audit was to evaluate the reported compliance of the Eastman Dental Hospital department of Paediatric Dentistry to the caries prevention advice provided by the Department of Health tool kit. This procedure aimed firstly to ensure that all appropriate patients were provided with the correct advice in relation to their level of risk; which would improve the consistency of preventive advice given to the patients within practitioners.

12.2.2 Standards

The gold standard for this audit was that all patients (100%) should be given the benefit of advice (not only those with risk) and this must be recorded in their notes. The Department of Health caries prevention toolkit “Delivering Better Oral Health: An evidence-based toolkit for prevention” was used as a standard for the caries prevention advice. This tool kit is an easy straightforward guide with clear advices categorized according to different age groups and caries risk.

12.3 Sample and Methods

12.3.1 Sample selection

This was a retrospective audit where patient's notes were investigated to check the reported compliance of EDH Department of Paediatric Dentistry to the caries prevention advice. All new patients' clinic lists for the period from 1st of January until 31st April 2013 were checked.

12.3.2 Methods

12.3.2.1 Production of data collection sheet

A data collection form was produced (Figure 12-1) including two-side A4 paper. A simple tick approach was used to fill this form. This form included three main sections. The first section was the basic demographic data including age and gender. The second section included caries risk assessment. This involved the medical history, evidence of active disease by measuring the DMFT and dmft. The patient was categorised into high or low risk accordingly. The patient was categorised as high risk if the medical history was positive and there was an evidence of active caries. The third section included the caries prevention advice that was provided to the patient and the professional recommendations according to their age and risk.

12.3.2.2 Data collection

All the patients who attended the new patient's clinic in the period chosen were identified electronically then the notes were requested from the medical records for further filtration. All the clinical notes were then checked and the patients who were referred primarily for caries were included. All the required information was then transferred to the data collection sheet for each patient. Then, all the data on these sheets were transferred into an Excel spread sheet for analysis.

Data extraction form for: the compliance of EDH paediatric department to tool kit caries prevention advice audit..

Demographics

Patient age in first attendance:

Patient sticker

Dental appointment

Date of first attendance / /

Seen by:

- ☐ Consultant
☐ PG
☐ Registrar

- ☐ SHO
☐ SOH

Caries risk assessment:

Medical history

- ☐ Yes

- ☐ No

If Yes specify:

Carious teeth:

D:

M:

F:

d:

m:

f:

Treatment to be carried out:

- ☐ LA/ without LA
☐ IS

- ☐ IV
☐ GA

Caries risk

- ☐ High
☐ Recorded

- ☐ Low
☐ Not recorded

Advice provided

- ☐ No advice provided

- ☐ Caries prevention advice given:

Date of advice / /

by:

Order of the advice appointment:..... appointment

- ☐ *Tooth brushing advice*

- ☐ Fluoride in toothpaste.....
☐ Amount of toothpaste
☐ Parents to brush their child teeth (<3 years)
☐ Supervised brushing (<7 years)
☐ Spitting without rinsing
☐ Brush twice daily
☐ Brush last thing at night

- ☐ Use a fluoride mouthrinse daily at a different time to brushing

- ☐ *Diet advice:*

- ☐ Diet sheet discussed
☐ Limit sugary intake to meal time
☐ Sugar should not be added to weaning foods
☐ Sugars should not be consumed more than four times per day
☐ Dietary supplements containing sugar and glucose polymers at mealtimes

- ☐ Use sugar-free medicines

Reinforcement of preventive advice

- ☐ Yes (/ /)
☐ Never

Professional intervention:

- ☐ Application of fluoride varnish (..... times in period from..... to.....)
- ☐ Review patients
 - Never seen following first appointment
 - Still on treatment
 - Finished treatment but not reviewed yet
 - Discharged
 - Reviewed (..... /year)
- ☐ Fissure sealed the permanent molars

Figure 12-1 data collection sheet

12.4 Results

12.4.1 Demographic data

The total number of patients that attended the new patient clinic for the period from January until April 2013 was 400 patients. These notes were pulled from the medical records and only 111 notes were referred primarily for caries and were therefore evaluated.

The overall age of the patients in their first attendance was ranging from 2-16 years. Patients were divided into three age groups according those provided by the toolkit; 0-3, 4-6 and over 6 years old. The number of patients in each group was: 9.9% (11) for the 0-3 age group, 41.4%(46) for the 4-6 age group and 48.6% (54) for older than 6 age group (figure 12-2). Forty-five present of the sample were males and 55% were females.

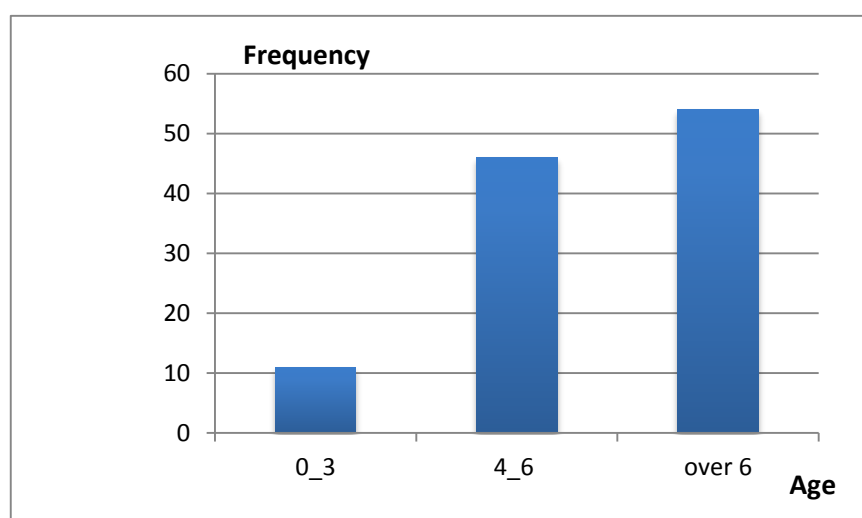


Figure 12-2: frequency of patients in different age groups

Medical history was not significant for 76.6% (85) of the patients. Only 26 patients had one of the following conditions: Asthma, Eczema, Ehlor Danlos syndrom, Heart disease, Adrenal hyperplasia, Low immune system, Hypermobility joints, Diabetes, Autism, Anaemia, Learning difficulties and Cancer.

12.4.2 Caries risk assessment and caries prevention advice

12.4.2.1 0-3 years age group

The average number of the carious teeth in this age group was 9 teeth ranging from 6-20 teeth. Out of the 11 patients, 81% had their treatment under general anaesthetic; while the remaining 18% had the treatment on chair with or without using local anaesthetic. All the patients in this age group were high-risk patients due to the presence of active caries on each one of them.

Caries prevention advice was not provided to 72.7% of the patients' parents although it was part of the treatment plan of 27.2% of them. Three patients' parents (27.2%) received preventive advice by their child dentist either in their first or second appointment. For those who received the information, only 18% had advice reinforcement in their follow up appointments.

Regarding the diet advice, only one patient's parents received a general advice regarding their children's diet. One patient's parents were provided with a diet sheet to discuss their child diet habits but it was never discussed afterwards. There were only two patients who received specific advice regarding their diet; one was advised to stop using the bottles and one was advised to limit their sugar intake to the mealtime. None of the patients' parents received any advice regarding not adding sugar to weaning food (Table 12-4).

General advice regarding oral hygiene instructions was provided to one patient only. While two patients' parents received specific information regarding oral hygiene where one of them received information regarding using high fluoridated toothpaste and the other was advised to spit only without rinsing following brushing. None of the patients' parents received information regarding how many times they have to brush their child teeth that they have to brush their children teeth and the amount of toothpaste to be used (Table 12-4).

Caries prevention advice	Number of patients received the advice
Tooth brushing advice-OHI (general)	9% (1)
• Amount of fluoride in toothpaste	0%
• Amount of toothpaste	0%
• Use high Fluoridated toothpaste	9% (1)
• Parent to brush if they are <3	0%
• Spitting without rinsing	9% (1)
• Brush twice daily	0%
• Brush last thing at night	0%
General Diet advice	9% (1)
• Diet sheet provided	9% (1)
• Diet sheet discussed	0%
• Not to add sugar to weaning food	0%
• Stop using the bottle	9% (1)
• Limit sugary intake to meal time	9% (1)
• Sugar not to be consumed more than 4 times/day	0%

Table 12-4 Summary of caries prevention advice provided to 0-3 years old age group

Regarding the professional applications provided by the toolkit, only 18% of the patients in this age group had professional Fluoride varnish application. It was applied once only within a period ranging from 1 to 2 months. Eighty-one percent of this group were discharged back to their general dentists, while only 9% were still under treatment and 9% finished their treatment. For those who finished their treatment, they were not reviewed although they were due for a review before two months of the day the notes were checked.

12.4.2.2 4-6 years age group

The average number of the carious permanent teeth in this age group was 2 teeth ranging from 0-2 teeth and the average number of carious primary teeth was 18.8 teeth ranging from 4-20. Out of the 46 patients, 36% had their treatment under general anaesthetic; while 19% had the treatment using inhalation sedation and 17.3% had their treatment on chair with or without using local anaesthetic as shown in figure 12-3. All the patients in this age group were high-risk patients due to the presence of active caries on each one of them.

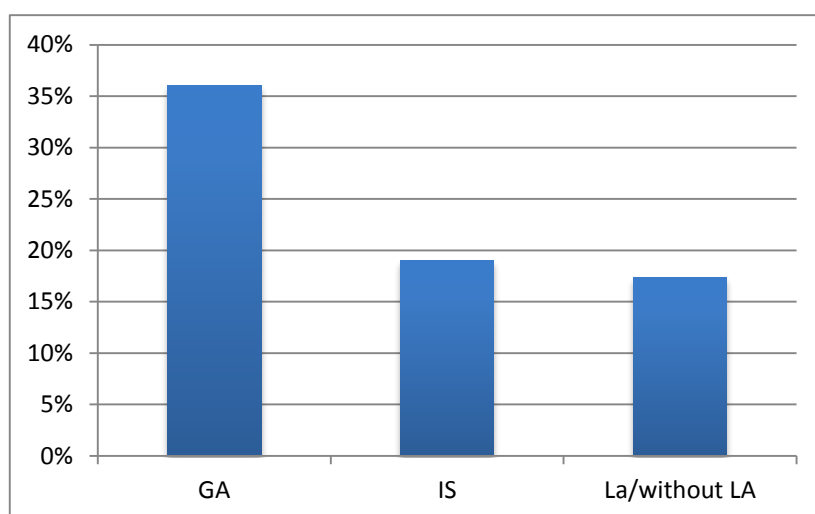


Figure 12-3 Behaviour management techniques for 4-6 years old group

Caries prevention advice was not provided to 71.7% of the patients although it was part of the treatment plan of 28.2% of them. Thirteen patients (28.2%) received preventive advice by their dentist in one of their first six appointments. For those who received the information, only 10.8% had advice reinforcement in their follow up appointments.

Regarding the diet advice, 10 patients received a general advice regarding their diet. One patient was provided with a diet sheet to discuss their diet habits but it was never discussed afterwards. There were only two patients who received specific advice regarding their diet; one patient was advised not to consume sugar more than 4 times a day and one patient was advised to limit their sugar intake to the mealtime (Table 12-5) .

General advice regarding oral hygiene instructions was provided to all the patients who received the preventive advice. Five patient received information regarding using high-fluoridated toothpaste. Four patients' parents were advised to supervise their children brushing their own teeth. Three patients were advised to brush twice daily and only one patient was advised to brush his teeth at night. None of the patients received information regarding the amount of toothpaste to be used and to spit only without rinsing following brushing (Table 12-5).

Caries prevention advice	Number of patients received the advice
Tooth brushing advice-OHI (general)	28.2%
• Amount of fluoride in toothpaste	0%
• Amount of toothpaste	0%
• Use high Fluoridated toothpaste	10.8% (5)
• Parent to brush if they are <7	8.6% (4)
• Spitting without rinsing	0%
• Brush twice daily	6.5% (3)
• Brush last thing at night	2.1% (1)
General Diet advice	21.7% (10)
• Diet sheet provided	2.1% (1)
• Diet sheet discussed	0%
• Limit sugary intake to meal time	2.1% (1)
• Sugar not to be consumed more than 4 times/day	2.1% (1)

Table 12-5 Summary of caries prevention advice provided to 4-6 years old group

Regarding the professional applications provided by the toolkit, 66.6% of the patients in this age group had fissure sealant in their 1st permanent molars however, only 21.7% had professional Fluoride varnish application. It was applied 1-3 time within a period ranging from 1 to 11 months. The majority of this group (76%) were also discharged back to their general dentists, while only 15.2% were still under treatment and 8.6% finished their treatment. For those who finished their treatment, 4.3% were not reviewed although they were due for a review up to two months before the day the notes were checked.

12.4.2.3 Over 6 years old age group

The average number of the carious permanent teeth in this age group was 9 teeth ranging from 0-18 teeth and the average number of carious primary teeth was 4 teeth ranging from 0-8. Out of the 54 patients, 42.5% had their treatment under general anaesthetic; while 31% had the treatment using inhalation sedation and 17.3% had their treatment on chair with or without using local anaesthetic. Only 1.8% of this age group had their treatment under intravenous sedation as shown in figure 12-4. The majority of this age group were high-risk patients due to the presence of active caries on each one of them and only 5.5% were low risk.

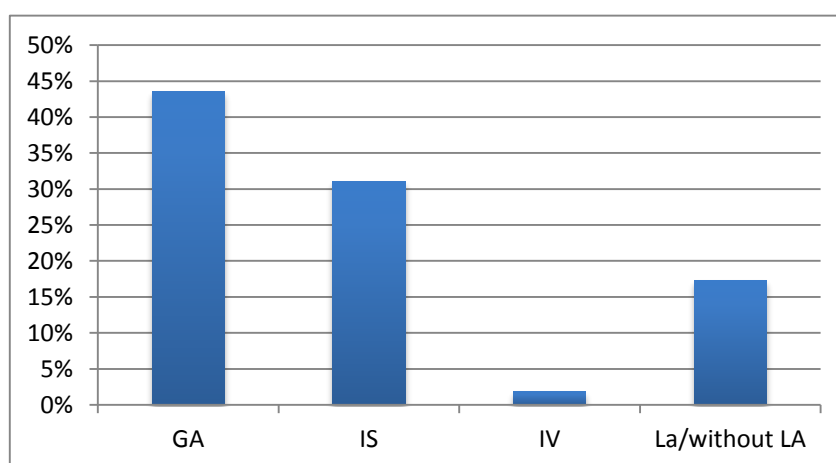


Figure 12-4 Behaviour management techniques for over 6 years old group

Caries prevention advice was not provided to 68.5% of the patients although it was part of the treatment plan of 12% of them. Only 17 patients (31.4%) received preventive advice by their dentist in one of their first six appointments. For those who received the information, only 11.8% had advice reinforcement in their follow up appointments.

Regarding the diet advice, 11 patients received a general advice regarding their diet. Five patients were provided with a diet sheet to discuss their diet habits but it was never discussed afterwards. Only one patient was advised to limit their sugar intake to the mealtime. None of the patients received advice not to consume sugar more than 4 times a day (Table 12-6).

General advice regarding oral hygiene instructions was provided to 15 patients. Five patient received information regarding using high-fluoridated toothpaste. Only one patient was advised to brush twice daily. None of the patients received information regarding the amount of toothpaste to be used, to spit only without rinsing following brushing and to brush their teeth last thing at night (Table 12-6).

Caries prevention advice	Number of patients received the advice
Tooth brushing advice-OHI (general)	27.7% (15)
• Amount of fluoride in toothpaste	0%
• Amount of toothpaste	0%
• Use high Fluoridated toothpaste	9.2% (5)
• Use of mouthwash	0%
• Spitting without rinsing	0%
• Brush twice daily	1.8% (1)
• Brush last thing at night	0%
General Diet advice	11
• Diet sheet provided	9.2% (5)
• Diet sheet discussed	0%
• Limit sugary intake to meal time	1.8% (1)
• Sugar not to be consumed more than 4 times/day	0%

Table 12-6 Summary of caries prevention advice provided to 4-6 years old group

Regarding the professional applications provided by the toolkit, 38.8% of the patients in this age group had fissure sealant in their permanent molars, however, only 16.6% had professional Fluoride varnish application. It was applied once only in a period ranging from 1 to 11 months.

The majority of this group (64%) were also discharged back to their general dentists, while only 18.5% were still under treatment and 16.6% finished their treatment. For those who finished their treatment, 98.9% were not reviewed although they were due for a review up to four months before the day the notes were checked.

12.5 Discussions

12.5.1 Demographics

The age range of the patients attending new patient clinics was 2-16 years old for the period selected. The number of patients in each age group seemed to be increasing as the age increases. This might be due to the reduced awareness of the parents to take their children to their dentists in young age especially for those in 0-3 age group. The average number of decayed teeth seems to be increasing with age, this might be explained due to the increase of the number of children with the increase of age in the sample selected. There were no differences with regards to gender.

12.5.2 Results

The majority of the patients in 0-3 age group were treated under general anaesthesia, which is expected as they are still young and cooperation is not expected to be present. Inhalation sedation also not used for children at this age so, general anaesthesia was considered the main behaviour management technique for their treatment. For those in 3-6 age group, the number of decayed teeth increased compared to the younger age group, this could be because the longer the period these teeth been in their mouth so the caries prevalence increased and with the presence of other factors such as irregular attendance to the dentist and lack of cooperation. Due to the number of the carious dentition and the lack of cooperation, the majority of this group also had treatment done under general anaesthesia followed by inhalation sedation. For the >6 years group, caries prevalence also increased compared to the previous age group as they started to have more teeth with permanent teeth eruption and the longer time of primary teeth presence in the mouth. Although children in this age group can cooperate, general anaesthesia was still the main rout of behaviour management followed by inhalation sedation then treatment with out any sort of treatment. This could be also explained by the fact that these patient were originally referred as their dentist failed to treat them in the chair and the came originally with high anxiety and general anaesthesia was the only option.

The majority of these children were high-risk patients due to the presence of active caries and the fact that treatment for the majority was done under general anaesthesia indicates that providing repetitive treatment was problematic. Those

patients were referred to the Eastman as a specialised tertiary centre to treat specific problem, which their general dental practitioner could not deal with. So the management of these patients was mainly focussed on treating these problems and refer them back to their dentist to carry out the reviews and prevention. So, preventive advices were not provided especially to this group of patients.

Following the general anaesthesia, these patients tend to be discharged without follow-up appointment with a standard letter to their general dentist with the treatment provided. The prevention was not included neither in the treatment plan at the Eastman nor as a recommendation on the discharge letter to their dentist, which should be present in both to enforce the parents to follow those preventive advices in this high-risk group. The problem in this was when to give the preventive advice, as those patients are usually seen in new patients clinics and send to GA waiting list at that appointment then discharged and the time is limited during the first appointment and parents usually busy trying to understand the plan and the procedure and become more occupied with the consent paper work. Patients used to have preventive appointment at the Eastman between their first appointment and their day surgery for reinforcement of prevention advice, however, patients used not to attend this appointment, as they do not expect any treatment then, so it was abandoned. It might worth trying to provide the parent with a simplified information leaflet with the key information for caries prevention in their first appointment and to add the caries prevention professional advice in the patient's discharge letter to their dentist.

12.6 Conclusion

We are currently not 100% complying with the Department of Health toolkit.
Preventive advice and intervention would be recommended.

12.7 Action plan

Prevention is everyone's responsibility. So, recommendations were made to construct a local information leaflet (figure 12-4), which was developed to include all the key preventive advices needed to be provided to the patients. Ideally, this leaflet should be provided to the parents in first treatment appointment if they will be treated at the Eastman or to be provided in their first appointment if they will be treated under general anaesthesia. Then it should be reported in the notes of the patient that this leaflet was provided.

A copy of this leaflet will also be sent with the dedicated letter to the general dental practitioner to use them in their future preventive advice for this patient.

The letter was constructed in a simplified attractive way so the parents can remember the information on it and was circulated within the department for comments prior to sending it to the hospital clinical governance committee.

Recommendations from this audit also included amending the standard discharge letter following general anaesthesia to include the request to continue the preventive advice and reviewing the patients.

A second audit cycle to be carried out to show the compliance of our department in distributing this leaflet and its reporting in the patients' notes.

Clean and Healthy Teeth

How to keep my teeth clean



- Brush at least twice a day, in the morning and just before bed

- 0-3 years: Parent to brush their child's teeth
- 4-7 years: parent to supervise their child brushing their teeth



- Spit, without rinsing



- Children over 7 years can use mouthwash at different time to brushing

- Use the right amount of tooth paste with right concentration of Fluoride

- 0-3 years: **1000** ppm
- Over 3 years: **1350-1500** ppm

- If needed

- Over 12 years: **2800** ppm
- Over 16 years: **5000** ppm



Tick each time you brush your teeth each day

	Week 1		Week 2		Week 3	
	Morning	Just before bedtime	Morning	Just before bedtime	Morning	Just before bedtime
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						
Saturday						
Sunday						

How to keep my diet safe



- Limit sugar intake to meal times

For children below 3 years:

- Avoid adding sugar to weaning food
- Stop bottle at age 18 months



- Have sugar-free safe snacks such as plain yoghurt, plain milk, breadsticks, oatcakes and cheese



Figure 12-4 caries prevention advice information leaflet.

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Chapter Thirteen

Cases



CASE REPORT

Management of Caries in A Young Child

Submitted by

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In partial fulfilment of the degree

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20011 - 2014

13 Caries Case summary

A.R. is a 6 year old young girl who was referred by her general dental practitioner (GDP) to the Eastman Dental Hospital (EDH), Department of Paediatric Dentistry for management of multiple carious teeth with a history of multiple failed restorations.

She had a history of multiple restorations on URD, ULD, LLE,LLD, LRD and LRE. The URD had been infected twice and her GDP performed a pulpectomy. She experienced intermittent pain from her upper teeth two months before she first presented to the EDH. When she presented at the EDH, she was complaining of pain in her upper right quadrant. The pain was intermittent associated with change in temperature and did not disturb her sleep. Two courses of antibiotics were prescribed by her GDP to control the infection together with paracetamol to control pain.

A.R. was diagnosed with Kawasaki's disease in 2006 and she was under the care of Dr Michael Rigby at royal Brompton and Harefield Hospital. She is on annual review for this condition.

She was a regular dental attendee to her GDP and had restorative and pulp treatment.

Upon examination, she presented with multiple caries on URE, URD, ULD, ULE, LLE, LLD, LRD and LRE; and a well localised, fluctuant abscess related to the URD.

Treatment was carried out under local anaesthesia (LA) alone or together with inhalation sedation (IS), in conjunction with non-pharmacological behaviour management (NPBM) techniques.

Treatment provided:

Prevention and acclimatization

-Oral hygiene instructions (OHIs).

- Dietary advice.

- Fissure sealant of the 6's.

Restorations

- Composite restorations on URE.

- Stainless steel crown (SSC) on LLE and LLD.

- Vital pulpotomy and SSC on LRD and LRE.

Extraction:

- Extraction of URD, ULD and ULE

13.1 Pre-operative clinical photographs (03/01/2012)

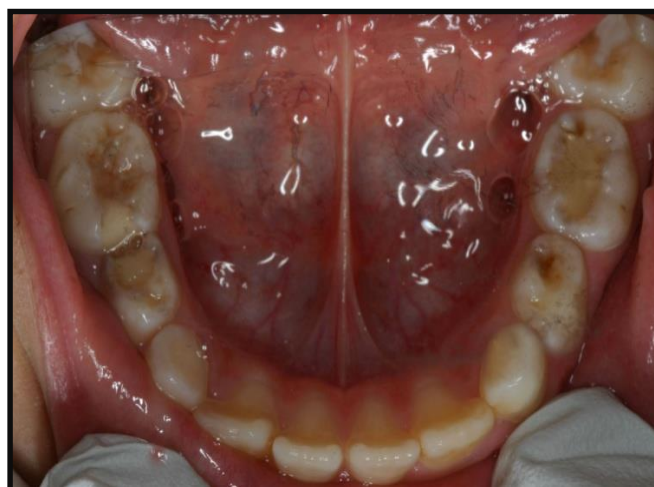
Frontal view



Upper occlusal view



Lower occlusal view



13.2

13.2 Post-operative clinical photographs (22/05/2014)



Upper occlusal view



Lower occlusal view



13.3 Case History

13.3.1.1 Personal data:

A.R.

Female.

Date of Birth: 17/10/2004.

Referred by: GDP.

Date of first attendance: 02/10/2011.

Age at presentation: 6 years and 11 month.



13.3.2 Chief Complaint (C/O)

Pain from upper right back tooth.

13.3.3 History of Complaint

Started two months ago.

Intermittent.

Associated with temperature change.

Controlled by paracetamol.

Two antibiotic courses.

No change in eating habit/ no loss of sleep.

13.3.4 Medical History (MH)

A.R. was diagnosed with Kawasaki's disease in 2006. She was under the care of Dr Rigby at Royal Brompton and Harefield Hospital.

She was born full term with normal delivery.

13.3.5 Family History

No family history of dental abnormalities.

13.3.6 Social History

She had one sister (26 years).

Year 2 in school.

13.3.7 Dental History

A.R. was a regular attendee to her GDP. She had restorations previously in URD, ULD, LLE, LLD, LRD and LRE. The URD had been infected twice and her GDP performed a pulpectomy.

No history of general anaesthesia (GA) or Fluoride supplement use.

13.3.8 Oral Hygiene

Brushes twice daily with children's toothpaste and a manual toothbrush.

13.3.9 Diet

She was a good eater and liked a variety of food. Previously consumed sweet and fruits between meals. She drank both juice and water.

13.3.10 Habits

No history of nail biting, thumb sucking or parafunctional activities.

13.4 Clinical Examination

13.4.1 Extra-Oral examination(E/O)

A shy girl.

Dentally anxious

Symmetrical face.

No regional Lymphadenopathy.

Normal mouth opening with no
temporomandibular joint abnormality.



13.4.2 Intra-Oral examination(I/O)

Soft tissue (ST): -

A well-localised fluctuant buccal swelling opposite to ULD and ULE, 2x2 mm in size.

Oral hygiene (OH): Fair (plaque index (PI):66%).

Occlusion:

Class I molar relationship.

Spacing between upper four incisors.

Dentition:

Early mixed dentition.

First permanent molars, central and lateral incisors are erupted.

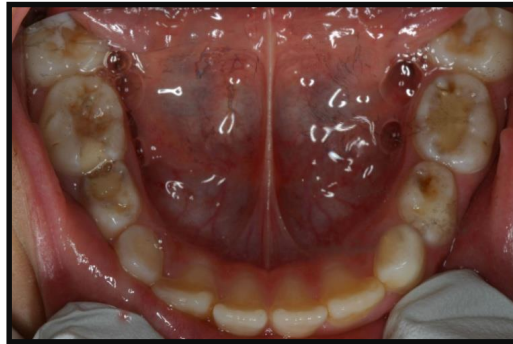
Caries present in all D's and E's.

Restorations on URD, ULD, ULD, LRD and LRE.

Upper occlusal view



Lower occlusal view



Frontal view



Teeth present:

6 E D C 2 1	1 2 C D E 6
6 E D C 2 1	1 2 C D E 6

Caries:

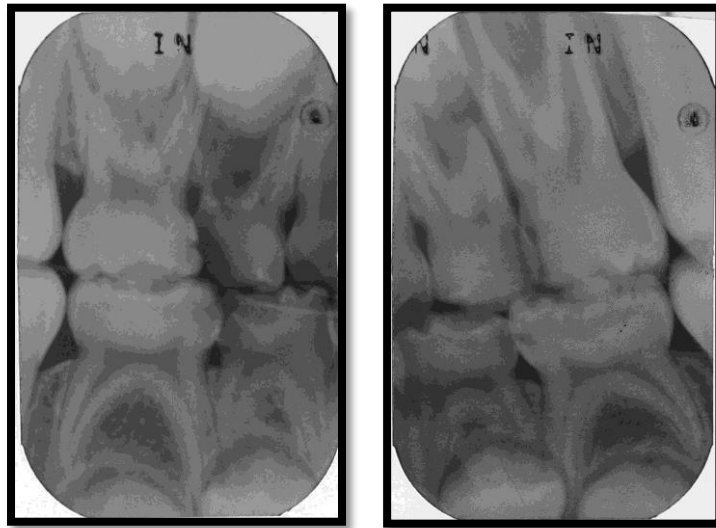
E D	D E
E D	D E

Fillings:

D	D E
E D	E

13.4.3 Pre-operative radiographs

Right and left Bitewings



Findings:

Radiolucency associated with crowns of URE, URD, ULD, ULE, LLE, LLD, LRD and LRE indicating caries.

Radiolucency in the bifurcation area of URD.

The roots of ULD and ULE are elongated with no clear periapical pathology due to poor quality x-ray.

Permanent successors can be seen in all quadrants except the upper left one due to poor quality x-ray.

13.5 Diagnosis and Treatment Planning

13.5.1 Diagnosis

Diet induced dental caries in a 7 year old anxious girl.

Dental abscess related to URD secondary to caries.

13.5.2 Treatment Objectives

To relieve the symptoms associated with URD.

To liaise with her cardiology consultant regarding Kawasaki's disease.

To promote oral preventive measures.

To restore function of the teeth.

To enhance positive attitude toward dental care and reduce dental anxiety.

13.5.3 Provisional Treatment Plan

Immediate treatment

Temporise URD.

Liaise with cardiac team.

Prevention

OHI.

Dietary education.

Fluoride varnish application every 4 months.

Fissure seal the 6's.

Behaviour management

To use all possible NPBM techniques.

Acclimatisation to dental environment.

If A.R. was unable to cope with treatment under LA, consider treatment under IS, otherwise, it will be completed under GA.

Restoration and extraction

Quadrant dentistry to involve:

Composite restorations on URE and ULE.

SSCs on LLE, LLD, LRE and LRD.

Extractions of URD and ULD.

Maintenance and follow up

Clinical review every 4 months.

Radiographic review every 6-12 months.

Reinforcement of dietary advice and OHI.

Discharge to GDP when dentally stable and caries free.

13.6 Treatment progress and dental management

13.6.1 Visit1 29/11/2011

Attended with mother.

Seen in new patient clinic by senior colleague.

History was taken, with clinical and radiographic examination.

A provisional treatment plan was formulated and discussed with the mother.

A diet sheet was given.

A letter to her cardiology consultant was sent to ensure no contraindications to dental treatment .

13.6.2 Visit2 03/01/2012

Attended with mother.

C/O: Pain:

Associated with solid food.

Intermittent.

History of multiple cheek swelling.

Antibiotic and paracetamol taken as prescribed by GDP.

MH: No change.

E/O: No abnormalities detected (NAD).

I/O: PI:66%.

Received a letter from cardiology consultant stating that A.R. had completely recovered and has no contraindications to dental treatment.

Treatment(TX):

Acclimatisation to clinic.

Prophylaxis using prophylactic paste.

Cotton rolls isolation:

-Acid etching (phosphoric acid 37%).

-Fissure sealant (Delton) of all first permanent molars.

URD:

-Caries excavation using spoon excavator (OD).

-Corticosteroid–antibiotic paste (Ledermix®) applied.

-Dressed with Zinc Oxide-Eugenol with polymer reinforcement (IRM®) filling.

OHI's given:

-Adult toothpaste with 1350ppm Fluoride or above.

-Spitting after brushing rather than rinsing.

-Use mouthwash (.05% Fluoride) between brushing.

Fluoride varnish (Duraphat 2.26%) applied in her primary molars.

Post-operative instructions (POI).

Pre-operative clinical photographs.

Behaviour: Anxious and partially co-operative.

13.6.3 Visit 3 06/02/2012:

Attended with mother.

C/O: pain:

- Upper left back teeth.
- Usually associated with eating solid, sweet food.
- Occasionally spontaneous.
- No analgesia required.

MH: No change.

E/O: NAD.

I/O: ST: localised fluctuant buccal swelling between the ULD and ULE, 2x2mm.

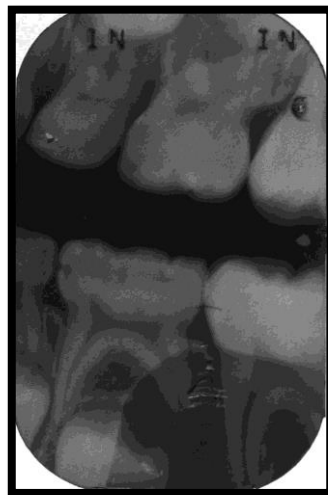
PI:33%.

TX:

- Left vertical bitewing was taken to check the source of abscess.

It showed no obvious radiolucent areas but the roots of ULD and ULE were resorbed.

Left bitewing



Discussed treatment options with mother: to temporise or extract. She agreed to extract the teeth today.

Written informed consent signed by mother.

ULD and ULE:

- Topical anaesthesia (TA)(20% benzocaine).
- LA administered as infiltration to LLD and DRE (1carpule 1.8mL, 2%lidocain with 1:80000 epinephrine).
- Simple forceps extraction of ULE and ULD.
- POIs.

Behaviour: Cooperative but anxious.

13.6.4 Visit4 14/02/2012

Attended with mother.

C/O: Mild pain:

- Lower right back tooth (E).
- Started a week ago.
- Associated with sweet food.
- Lasts for a few minutes.
- No loss of sleep, no analgesia given.

MH: No change.

E/O: NAD.

I/O: PI:22%.

TX:

LRE:

- TA.
- LA administered as infiltration to LRD and LRE (1carpule).

- Dray dam isolation.
- Cavity preparation (O), carious exposure.
- Vital pulpotomy performed using Ferric Sulphate (FS)(15.5%).
- IRM® filling.
- Tooth preparation (O,M,D).
- SSC (3M) size5, cementation using GIC luting cement (aquacem).
- Removal of excess cement.
- POIs.

Behaviour: Anxious and un-cooperative especially during LA delivery.

To consider treatment under IS with Wand (computer controlled anaesthesia) for LA delivery.

13.6.5 Visit5 25/04/2012

Attended with mother.

C/O: Nil.

MH: No change.

E/O : NAD.

I/O: PI:0%.

TX:

Written informed consent signed by mother.

IS: Introduction to equipment.

Nitrous Oxide (N₂O) titrated in increments to 35%N₂O:65%O₂.

TA.

LA administered adjacent to URE and URD using Wand (1carpule).

URE:

-Dry dam isolation.

-Cavity preparation (OM).

-Etching, bonding, composite filling (shade: Gradia Posterior A1).

URD:

-Simple extraction using molar forceps.

100% O₂ for 5m, uneventful recovery.

Behaviour: Anxious but cooperative.

13.6.6 Visit6 09/05/2012:

Attended with mother.

C/o: Nil.

MH: No change.

E/O: NAD.

I/O: PI:0%.

TX:

IS: N₂O titrated in increments to 35%N₂O:65%O₂.

TA.

LA administered adjacent to LLE and D using Wand (1/2carpule).

Dry dam isolation.

LLE:

- Cavity preparation (OM).
- Tooth preparation (O,M).
- SSC size5 cemented using aquacem.

LLD:

- Cavity preparation (O).
- Tooth preparation (O,M,D).
- SSC size4 (adjusted using crimper) cemented using aquacem.

Removal of excess cement.

POIs.

100% O₂ for 5m, uneventful recovery.

Behaviour: Anxious during LA delivery but very cooperative throughout treatment.

13.6.7 Visit7 22/05/2012

Attended with mother.

C/O: Nil.

MH: No change.

E/O: NAD.

I/O: PI:0%.

Space loss distal to LLD.

TX:

IS: N₂O titrated in increments to 35%N₂O:65%O₂.

LRD:

- TA.
- LA administered adjacent to LRE and D using Wand (1/2carpule).
- Rubber dam isolation.
- Cavity preparation (O), carious exposure.
- Vital pulpotomy performed.
- IRM® filling.
- Tooth preparation (O,M,D).
- SSC size3 (adjusted using crimper) cementation.
- Removal of excess cement.
- The SSC was slightly high on the distal side.

100% O₂ for 5m, uneventful recovery.

Post-operative photographs.

Post-operative left bitewing was taken.

The SSC on the LLD was slightly high distally.

Behaviour: Anxious with LA delivery but very cooperative during treatment, however, she became tired and uncooperative toward the end of the appointment.

Right bitewing



**13.7 Visit 8 (15/10/2012) , 9 (03/04/2013), 10 (20/11/2013) and 11
(20/05/2014)**

Patient was reviewed following 4 months, 6 months and 1 year.

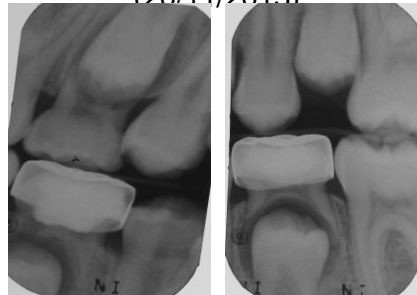
In each visit, OHI were reinforced together with diet advice.

In her last visit, all her permanent teeth erupted except LR5.

She was caries free with no evidence of clinical or radiographic pathologies.

Therefore, she was discharged back to her general dentist for regular reviews.

Right and left bitewing
(20/11/2013)



13.8

13.8 Post-operative clinical photographs (22/05/2014)

Frontal view



Upper occlusal view



Lower occlusal view



13.9 Appraisal and Discussion

A.R. had an extensive history of caries, pain, abscess and restorative procedures. Our treatment aims were to relieve the symptoms; to protect her permanent dentition; to shape her attitude and behaviour towards dentistry; and to stabilise and restore the primary molars to maintain space and integrity of the mouth.

Regarding her general health, she had recovered from Kawasaki disease and there were no contraindications to dental treatment.

A.R. and her mother were keen to have all the treatment to be finished. They attended all the appointments and were always on time. A.R.'s oral hygiene gradually improved toward the end of treatment indicating that she understood her role in maintaining good oral health. Quadrant dentistry was possible in most of the appointments but treatment had to be modified appropriately due to treatment complexity and her co-operation.

She was initially anxious to the dental environment, the previous dental history was vague as mother cannot remember if A.R. had LA previously, however, her GDP performed pulpectomy in the URD assumingly using LA and her reaction toward LA was not clear. Therefore, treatment was planned to be carried out under LA together with NPBM techniques as she was willing to sit for dental examination. It has been reported that children with dental problems would exhibit negative behaviour (Wright *et al.*, 1973). Therefore, treatment started with simple procedures (excavation and temporisation of URD) to reduce the pain and to gain her confidence. After a few visits, where she had multiple extractions due to the presence of pain and abscess, she could not longer cope with LA alone; therefore, treatment was carried out using IS to help manage her dental anxiety.

IS using N₂O has shown a high success rate (Blain and Hill, 1998) and reported to be highly effective in reducing anxiety that can last up to 2 years following treatment

(Veerkamp *et al.*, 1993). It remains the preferred technique for managing mild to moderate anxiety in paediatric dental patients (Hosey, 2002).

Prevention

A.R. was a high caries risk patient, due to high sugar consumption rate; poor oral hygiene and low Fluoride availability; together with caries experience in primary molars which may predict caries in the permanent dentition. Therefore, a vigorous preventive regimen was formulated according to the Department of Health tool kit (Department of Health, 2009).

A.R. was advised to reduce the amount and frequency of sugary intake during the day and to be limited to mealtimes.

Tooth brushing helps in mechanical removal of dental biofilm, which contributes in both gingival disease and caries process. It is also considered a way for Fluoride delivery via toothpaste and had been shown to be effective in dental caries prevention (Marinho *et al.*, 2003). A.R. used to brush her teeth twice daily which was encouraged (Chestnutt *et al.*, 1998), and advised to brush for at least 3 minutes (Ashley, 2001) using adult toothpaste containing at least 1350 ppm Fluoride. She was advised to spit without rinsing after brushing which would reduce the caries by 30% (Ashley *et al.*, 1999) and to use Fluoride mouthrinse daily (0.05% NaF) at a different time to brushing. In addition, Fluoride varnish will be applied professionally every 3-4 months. Improvement in oral hygiene had been noticed toward the end of the treatment.

A.R.'s first permanent molars looked healthy but she was considered a high risk patient, therefore, it was important to seal them to reduce the risk of caries development (Nunn *et al.* 2000). Ahovuo-Saloranta and colleagues concluded their review that taking this measure would reduce caries, where only 27% of the sealed teeth developed caries after 9 years (Ahovuo-Saloranta *et al.*, 2008).

Restorations

The decay on URE was minimum and composite was preferred as it is more conservative, effectively bond to teeth, with good mechanical strength and wear resistant compared to amalgam and GIC (Tyas *et al.*, 2000).

Vital pulpotomy was performed in LRE and LRD. A.R. was complaining of pain in LRE and from the history it seems to be reversible pulpitis as it was transient and aggravated by sweet food without disturbance of sleep and eating; and LRD was asymptomatic. There were no signs of infection radiographically and pulp exposure occurred with caries removal. FS (15.5%) was used as it is considered an excellent haemostatic agent that forms a ferric ion–protein complex on contact with blood and blocks the blood capillaries and hence, stops bleeding. FS shown to have similar outcomes of formocresol (FC) (Peng *et al.*, 2007) and the success rate of vital pulpotomy using FS was reported to be >90% in two years (Casas *et al.*, 2003).

LLD and LLE indicated SSCs as they had multi-surface restorations while the LRE and LRD had pulpotomy (Kindelan *et al.*, 2008). These crowns shown to have high success rate up to 97% in 7 years (Roberts *et al.*, 2005).

Regarding LRD, the space was minimum and adjustment of the SSC was required. After placement, it was slightly high on the distal side clinically and radiographically. However, it was fitted properly; therefore, it was decided to monitor the tooth rather than redoing the treatment.

Maintenance

A.R. was reviewed up to 18 months following finishing her treatment for reinforcement of dietary advice and OHI as recommended by the Department of health (2009). She managed to keep very good oral hygiene, and adopted healthy diet habits. She was changed from being a high-risk patient into a low risk patient and was therefore discharged back to her general dentist for regular check-ups every 6 months.

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CASE REPORT

Complex restorative treatment (Managing the developing child)

Submitted by

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In partial fulfilment of the degree

Clinical Doctorate in Paediatric Dentistry

Eastman Dental Institute

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20011 - 2014

14 Complex case summary

H.J., a 7 year old young boy, who was referred by his general dental practitioner (GDP) to the Eastman Dental Hospital (EDH), Department of Paediatric Dentistry for management of his discoloured primary and permanent teeth.

A diagnosis of Autosomal dominant hypoplastic amelogenesis imperfecta was made based on the history and clinical examination, together with the presence of two conical supernumeraries (one erupted and the other is un-erupted). He has mild anterior crowding and increased overjet associated with UR1.

His main complains when he first presented were the colour of his teeth and the sensitivity associated with his permanent dentition.

He was medically fit and healthy with no history of any early childhood illnesses or systemic disorders. He was a regular dental attendee to his GDP and had no previous dental treatment.

Upon examination, he presented with generalised smooth hypoplastic enamel with localised demarcated yellowish brown discolouration at the incisal/occlusal third of his dentition (+++permanent). A conical supernumerary was erupted palatal to the UR1 causing its labial displacement. Radiographic examination revealed the presence of an inverted conical supernumerary in a vertical position between the apical half of the upper central incisors roots.

Treatment was carried mainly using non-pharmacological behaviour management (NPBM) techniques; however, inhalation sedation (IS) together with appropriate local anaesthetic (LA) were used during extraction of the erupted supernumerary.

Treatment provided:

Prevention and acclimatization

- Oral hygiene instructions (OHIs).
- Dietary advice.

Liaison with orthodontic department

Restorations

-Composite veneers on UR2, UR1, UL1, LL2, LL1, LR1 and LR2.

-Pre-formed metal crowns (PMCs) on 6's.

Extraction of erupted supernumerary tooth.

14.1 Pre-operative clinical photographs (16/01/2013)

Frontal view



Upper occlusal view

14.2



Lower occlusal view



14.2 Post-operative clinical photographs (16/06/2014)

Frontal view



Upper occlusal view



Lower occlusal view



14.3 Case History

14.3.1 Personal data:

H.J.

Male.

Date of Birth: 08/01/2005.

Referred by: GDP.

Date of first attendance: 16/01/2013.

Age at presentation: 7 years and 11 months.



14.3.2 Reason for referral:

He was referred by his GDP regarding his discoloured primary and permanent teeth.

14.3.3 Chief Complaint (C/O)

H and his father were complaining about the colour of H front teeth.

14.3.4 History of Complaint

H's father noticed the brown discoloration in the newly erupted anterior teeth.

Slight sensitivity in the back teeth:

Associated with crunchy food and change in temperature.

Does not disturb eating and sleeping.

Does not require pain-killer.

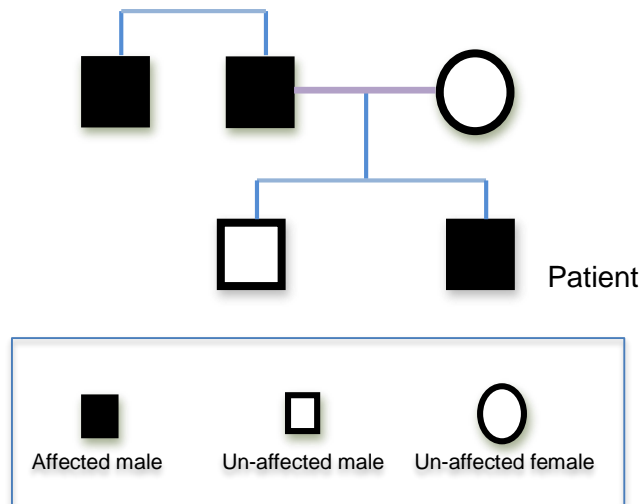
No previous treatment.

14.3.5 Medical History (MH)

He is a fit and healthy child who was born full-term with normal delivery. His immunisations were up-to-date and did not suffer any early childhood illnesses.

14.3.6 Family History

His father and paternal uncle were affected with similar dental condition. Full family history from Pakistan could not be obtained.



14.3.7 Social History

He has one older brother (9 years).

He was born in the UK and attends main stream school.

Year 2 in school.

14.3.8 Dental History

H was a regular attendee to his GDP 6-monthly. He had no history of fillings, local anaesthesia (LA), general anaesthesia (GA) or Fluoride supplement use.

14.3.9 Oral Hygiene

He brushes once daily with children's toothpaste and a manual toothbrush.

14.3.10 Diet

He was a good eater and liked a variety of food. Previously consumed sweet, crisps and fruits between meals and liked to drink fizzy drinks, juice and water.

14.3.11 Habits

No history of nail biting, thumb sucking or parafunctional activities.

14.4 Clinical Examination

14.4.1 Extra-Oral examination(E/O)

A shy quite boy.

Avoid smiling and talking.

Symmetrical face.

No regional Lymphadenopathy.

Normal mouth opening with no Temporomandibular joint abnormality.

High lip line.

14.4.2 Intra-Oral examination(I/O)

Soft tissue (ST):

Localised thickening of the gingivae (labial to the lower incisors).

The gingival level of UR1 is 3 mm higher than UL1.

Oral hygiene (OH):

Good (plaque index (PI): 17%) (Simplified oral hygiene index by Green and Vermilion 1964).

Occlusion:

Permanent molar relationship: class I on the right and left sides.

Mild crowding in the upper and lower anterior segments.

Deep bite:

- UL1: complete with the labial gingivae of lower incisors.
- Lower incisors: complete with palatal gingivae.

Overjet: UL1: 3mm.

UR1: 7mm.

Edge to edge occlusion on LC's.

Dentition:

Mixed dentition.

First permanent molars, central and lateral incisors, except UL2, are erupted.

Caries free dentition.

Tooth surface loss in C, D, E's.

Erupted conical supernumerary tooth palatal to UR1.

Enamel Defect (DDE):

Smooth hypoplastic phenotype affecting both dentition (more prominent in permanent dentition) with demarcated yellowish brown discolouration at the incisal/occlusal third.

Upper occlusal view



Lower occlusal view



Frontal view

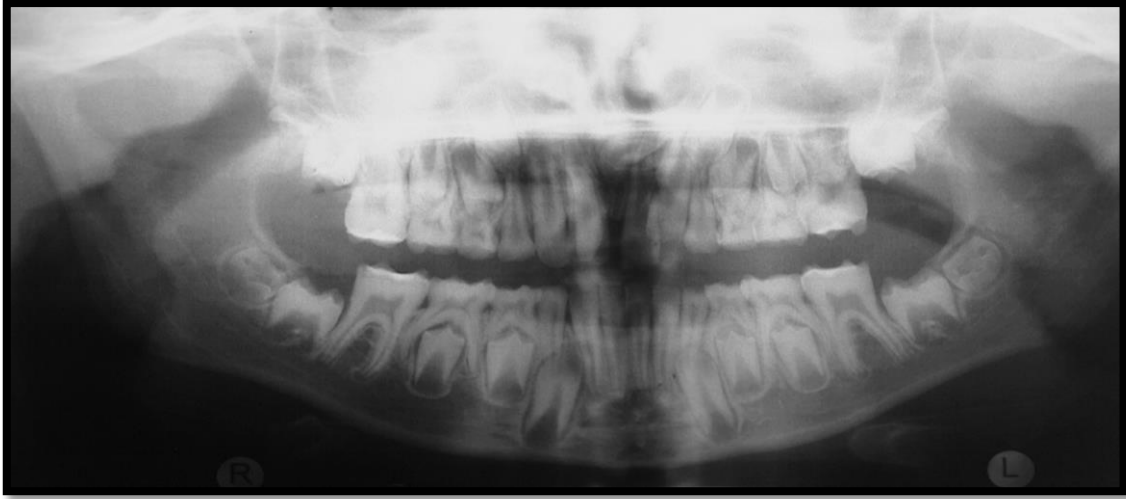


Teeth present:

6 E D C 2 \$ 1	1 C D E 6
6 E D C 2 1	1 2 C D E 6

14.4.3 Pre-operative radiographs

Orthopantogram



Long cone peri-apicals

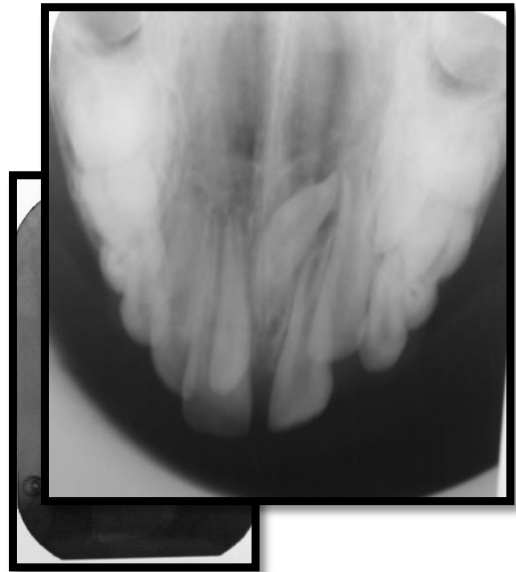


Findings:

Permanent successors can be seen in all quadrants.

Very thin layer of enamel covering the

teeth.



Erupted supernumerary palatal to UR1.

Un-erupted inverted supernumerary vertically located at the apical half between the developing immature roots of UR1 and UL1.

14.5 Diagnosis and Treatment Planning

14.5.1 Diagnosis

Amelogenesis imperfect (autosomal dominant).

Erupted conical supernumerary.

Un-erupted inverted supernumerary.

Orthodontic:

- Mild crowding in the anterior segment.
- Increased overjet UR1.

14.5.2 Treatment Objectives

To relieve the symptoms associated with permanent teeth.

To promote oral preventive measures.

To restore function and aesthetic.

To prevent loss of vertical dimension.

To stabilise dentition until definitive treatment can be done.

To enhance positive attitude toward dental care.

14.5.3 Provisional Treatment Plan

Immediate treatment

GIC coverage of first permanent molars to reduce sensitivity.

Prevention

OHI.

Dietary education.

Fluoride varnish application every 4 months.

Behaviour management

To use all possible NPBM techniques.

Acclimatisation to dental environment.

Consider extracting the supernumerary under IS.

Restoration and extraction

Referral to Orthodontic department for proper short and long-term treatment planning regarding supernumerary teeth, first permanent molars and need for future orthodontic treatment.

Restorative:

- Preformed metal crowns (PMCs) on 6's
- Composite veneers UR2, UR1, UL1, LL2, LL1, LR1 and LR2.

Extraction of the erupted supernumerary.

Maintenance and follow up

Clinical review every 4 months.

Reinforcement of dietary advice and OHI.

Monitor eruption of UL2, canines and premolars +/- composite coverage.

Monitor un-erupted supernumerary after completion of central incisors development +/- surgical extraction.

Monitor composite veneers and PMCs

Radiographic review if require every 6-12 months.

14.6 Treatment progress and dental management

14.6.1 Visit1 16/01/2013

Attended with father.

History with clinical and radiographic examination were undertaken.

A provisional treatment plan was formulated and discussed with the father.

Referred to the Orthodontic department for treatment planning.

Pre-operative clinical photographs.

Glass Ionomer Cement temporary filling (Fuji IX) filling to cover the 6's.

Fluoride varnish (Duraphat2.26%) applied.

OHI:

- Adult toothpaste with 1350ppm Fluoride or above.
- Spitting after brushing rather than rinsing.
- Use mouthwash (0.05% Fluoride) between brushing.

Diet advice.

Behaviour: Shy but very cooperative.

FIS: 

14.6.2 Visit2 15/02/2013

Attended with father.

C/O:

H was bothered about the look of his teeth.

MH: No change.

E/O: No abnormalities detected (NAD).

I/O: PI:11%.

Treatment(TX):

UR1, UL1, UR2:

Dry dam isolation:

- Acid etching (phosphoric acid 37%).
- Bonding, composite filling (shade: Gradia AO1 and A1).

Orthodontic separators placed mesial to UR6 and UL6.

Behaviour: slightly anxious due to sensitivity, but very cooperative.

FIS: 

14.6.3 Visit3 13/03/2013:

Was seen by the orthodontic department.

Treatment plan:

- To extract the erupted conical supernumerary.
- To monitor the un-erupted mesiodens in view of the incomplete root formation of both central incisors.
- They will review him in 6 months to monitor the eruption of UL2 and to consider extraction of ULC if it did not.

14.6.4 Visit4 15/03/2013

Attended with father.

C/O: Nil.

MH: No change.

E/O: NAD.

I/O: PI:0%.

TX:

Topical anaesthesia.

UR6, UL6:

- PMCs size 3 (trimmed and adjusted using crimper) cemented using aquacem.
- Removal of excess cement.

Orthodontic separators placed mesial to UR6 and UL6.

POIs.

Behaviour: very cooperative.

FIS:



14.6.5 Visit5 05/04/2013

Attended with father.

C/O: Nil.

MH: No change.

E/O: NAD.

I/O: PI:0%.

TX:

Topical anaesthesia

LR6, LL6:

- PMCs size 4 (trimmed and adjusted using crimper) cemented using aquacem.
- Removal of excess cement.

POIs.

Behaviour: very cooperative.

FIS:



14.6.6 Visit6 19/04/2013:

Attended with father.

C/O: Nil.

MH: No change.

E/O : NAD.

I/O: PI:0%.

TX:

Written informed consent signed by father.

IS: Introduction to equipment.

Nitrous Oxide (N₂O) titrated in increments to 35%N₂O:65%O₂.

Topical anaesthesia (TA).

Local anaesthesia (LA) administered intraligimintally using Wand (3/4 carpule 2.2mL with 2% lidocaine and 1:80,000 epinephrine).

Upper erupted supernumerary:

- Simple extraction using incisors forceps.
- Haemostasis achieved.

100% O₂ for 5m, uneventful recovery.

Behaviour: very cooperative.

FIS:



14.6.7 Visit7 08/05/2013

Attended with father.

C/O: no complains

MH: No change.

E/O: NAD.

I/O: PI:0%.

UL2 is partially erupted (palatal).

UR1 overjet: 5mm

TX:

LR2, LR1, LL1, LL2:

Dry dam isolation:

-Acid etching (phosphoric acid 37%).

-Bonding, composite filling (shade: Gradia AO1 and A1).

Post-operative photographs.

Behaviour: slightly anxious due to sensitivity, but very cooperative.

FIS:



14.6.8 Visit 7 (15/09/2013), 8 (11/01/2014) and 9(16/06/2014)

Attended with father for 4/12 reviews. In his last visit:

C/O: no complains

MH: No change.

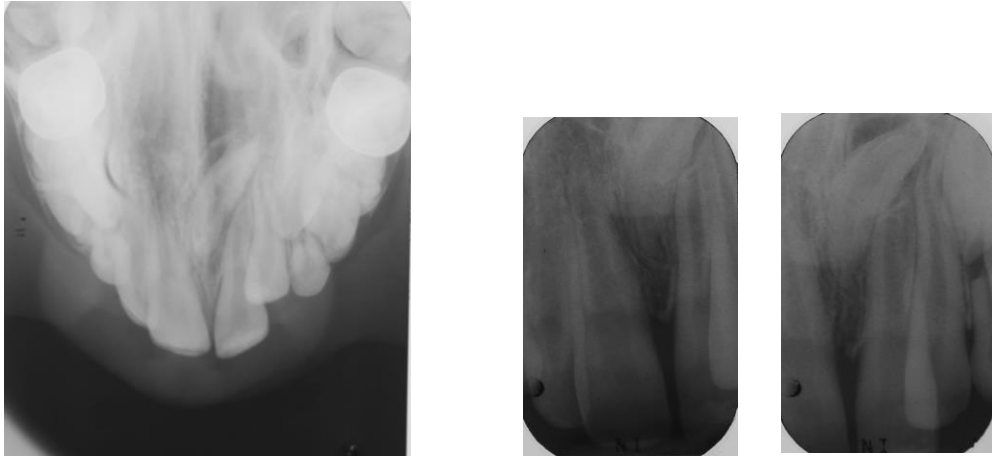
E/O: NAD.

I/O: PI:0%.

UL2 is partially erupted (palatal).

UR1 overjet: 2 mm

Radiographic examination:



Radiographs revealed slight resorption of the UL1 root associated with the supernumerary tooth.

TX:

UL1 was responding to vitality testing

UL2:

-Acid etching (phosphoric acid 37%).

-Bonding, composite filling (shade: Gradia AO1 and A1).

F- varnish applied with POIG

Behaviour: very cooperative.

FIS: 😊

14.6.9 Long-term plan:

To review H after 6 months:

- Reinforcement of OHI and diet advices.
- Monitor developing dentition.
- Monitor un-erupted supernumerary and associated teeth (UL1 and UR1)
- Monitor composite veneers and PMCs.
- Refer to orthodontic clinics for treatment planning

14.6.10 Post-operative clinical photographs (16/06/2014)

Frontal view



Upper occlusal view



Lower occlusal view



14.7 Appraisal and Discussion

H.J. was diagnosed with Amelogenesis imperfect. which is a hereditary enamel defect affecting the structure and clinical appearance of the enamel of all or nearly all the teeth in a more or less equal manner and which may be associated with morphologic or biochemical changes elsewhere in the body (Crawford et al , 2007). From the family history, the mood of the inheritance seemed to be autosomal dominant as the father and uncle were also affected. He also had two conical supernumerary teeth; one of which was erupted and the other was not. Our treatment aims were to relive the dental sensitivity and hens, improve the oral hygiene; to maintain the existing permanent dentition; to restore aesthetic; to maintain the vertical dimension, and to shape his attitude and behaviour towards dentistry.

Regarding his general health, he was fit and healthy with no history of early childhood illnesses or any systemic disorders.

H.J. and his father were keen to have all the treatment finished. They attended all the appointments and were always on time. H.J.'s oral hygiene improved following covering the teeth, which indicate that the teeth sensitivity was preventing maintenance of oral hygiene.

He was initially anxious to the dental environment as no previous dental treatment has been done. Treatment was planned to be carried out using NPBM techniques as he was willing to sit for dental examination. It has been reported that children with dental problems would exhibit negative behaviour (Wright *et al.*, 1973). Therefore, treatment started with simple procedures (GIC coverage on 6's) to reduce the sensitivity and to gain his confidence. Inhalation sedation (IS) was chosen as a behaviour management technique during extraction of the upper supernumerary in conjunction with LA and NPBM, which helped reducing anxiety and distress associated with removing teeth.

IS using N₂O has shown a high success rate (Blain and Hill, 1998) and reported to be highly effective in reducing anxiety that can last up to 2 years following treatment (Veerkamp *et al.*, 1993). It remains the preferred technique for managing mild to moderate anxiety in paediatric dental patients (Hosey, 2002).

Prevention

H.J. was considered a high-risk patient due to the defect on the enamel of his teeth caused by AI. Diet analysis showed high sugar consumption rate together with fizzy drinks consumption. His oral hygiene was fair but he used low Fluoride concentration toothpaste. Therefore, a preventive regimen was formulated according to the Department of Health tool kit (Department of Health, 2009).

H.J. was advised to reduce the amount and frequency of sugary intake during the day and to be limited to mealtimes and to reduce the use of fizzy drinks.

Tooth brushing helps in mechanical removal of dental biofilm, which contributes in both gingival disease and caries process. It is also considered a way for Fluoride delivery via toothpaste and had been shown to be effective in dental caries prevention (Marinho *et al.*, 2003). H.J. used to brush his teeth once daily and was encouraged to brush twice daily (Chestnutt *et al.*, 1998), and advised to brush for at least 3 minutes (Ashley, 2001) using adult toothpaste containing at least 1350 ppm Fluoride. He was advised to spit without rinsing after brushing which would reduce the caries by 30% (Ashley *et al.*, 1999) and to use Fluoride mouthrinse daily (0.05% NaF) at a different time to brushing. In addition, Fluoride varnish will be applied professionally every 3-4 months. Improvement in oral hygiene had been noticed during the course of treatment specially after covering the sensitive areas.

Restorations

Composite veneers were placed in the erupted incisors. It was preferred as the teeth were still partially erupted and growth is still not completed. It is more conservative, effectively bond to teeth, with good mechanical strength and wear resistant compared to GIC and porcelain veneers (Tyas *et al.*, 2000).

First permanent molars were moderately, therefore, pre-formed metal crowns (PMCs) were used as they offer full coverage of the affected teeth and protect them for as long as possible. PMC's are durable restorations and have been indicated for restoring both primary and permanent teeth with developmental defects in children and adolescents. Onlays are considered an alternative option, however, marginal leakage with associated decay might occur. This type of decay is difficult to detect, therefore this option was not considered (Tahmassebi, *et al.*, 2003).

Supernumerary teeth

It was indicated to remove the erupted supernumerary tooth as it was erupted and causing displacement of the UR1 labially leading to gingival discrepancy and increase the overjet. Monitoring of the un-erupted supernumerary was considered and was confirmed after orthodontic consultation where the apexes of the central incisors were not fully formed, difficulties of removing inverted conical supernumerary, no signs of pathology associated with the supernumerary and no active orthodontic treatment required at this stage of treatment (Poornima *et al*, 2012).

Maintenance and review

H.J. was reviewed every four months for 1 year period and will be reviewed every 6 months to reinforce OHI and dietary advice (Department of Health, 2009), to monitor the developing dentition and eruption of the UL2, to monitor the un-erupted supernumerary and associated upper central incisors, and to monitor the composite veneers and PMCs. Radiographic review will be every 6-12 months as needed (SDCEP, 2010).

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CASE REPORT

Special Care Dentistry for the Child & Adolescent

Submitted by

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BDS , MSc. MFDS (Edn)

In partial fulfilment of the degree

Clinical Doctorate in Paediatric Dentistry

Eastman Dental Institute

University College London

20011 - 2014

15 Medical case summary

E.S. is a 12 year old young boy who was referred by his general dental practitioner (GDP) to the Eastman Dental Hospital, Department of Paediatric Dentistry for management of multiple carious permanent teeth.

His medical history involved ADHD and mild asthma. He was diagnosed with ADHD at age of 5 and taking Retalin 10mg up to twice daily.

He was not a regular dental attendee and his GDP failed to restore his teeth.

When he first presented at EDH, he was asymptomatic with no history of pain or discomfort. Upon examination, he presented with multiple Caries affecting UR6, UR5, UR4, UR2, UR1, UL1, UL2, UL4, UL6, LL6, LL2 and LR6.

Treatment was carried out under local anaesthesia (LA) and inhalation sedation (IS), in conjunction with non-pharmacological behaviour management (NPBM) techniques.

Treatment involved:

Immediate treatment

Temporise UR2, UR1, UL1 and UL2.

Liaise with his paediatrician.

Liaise with Orthodontic department.

Prevention

OHI.

Dietary education.

Fluoride varnish application (duraphat Fluoride varnish 2.26%) every 3-4 months.

Fissure seal the premolars and second permanent molars.

Restoration and extraction

Composite restorations on UR5, UR4, UR2, UR1, UL1, UL2, UL4, UL5 and LL2.

Root canal treatment of UR2 and UL2

Extractions of all first permanent molars under general anaesthesia (on the waiting list).

15.1 Pre-operative clinical photographs (03/12/2012)

Frontal view



Upper occlusal view



Lower occlusal view



15.2 Post-operative clinical photographs (17/06/2014)

Frontal view



Upper occlusal view



Lower occlusal view



15.3 Case History

15.3.1 Personal data:

E.S.

Male.

Date of Birth: 08/09/2000.

Referred by: GDP.

Date of first attendance: 03/12/2012.

Age at presentation: 12 years and one month.

15.3.2 Reason for referral

E.S. was referred by his general dental practitioner (GDP) regarding carious permanent molars and upper incisors.

15.3.3 Chief Complaint (C/O)

E complained about food impaction in his back teeth.

No history of pain or disturbance in eating or drinking.

No history of abscess or facial swelling.

15.3.4 Medical History (MH)

Attention deficit hyperactivity disorder (ADHD):

Diagnosed in 2005.

On regular 6 months reviews with local hospital at Bedford.

Take 10 mg Retalin 1-2/day (was 5mg 2/day).

Associated with dyslexia.

Asthma:

Diagnosed when he was 3 years old.

Using ventolin (salbutamol) 2 puffs 2/day.

Last asthma attack was when he was 3 years old.

He was born full-term with normal delivery. His immunisations were up-to-date and did not suffer any early childhood illnesses.

15.3.5 Family History

No family history of dental abnormalities.

15.3.6 Social History

He had one brother (8 years).

Year 7 in school.

One to one teacher.

15.3.7 Dental History

E.S. was not a regular dental attendee.

Several unsuccessful attempts to restore his teeth.

No history of local anaesthesia, general anaesthesia (GA) or Fluoride supplement use.

15.3.8 Oral Hygiene

He did not brush his teeth regularly especially at night, and used adult toothpaste and manual toothbrush.

15.3.9 Diet

He was a good eater and liked a variety of food. Previously snaked more than three times a day with sweets and fruits between meals. He drank a lot of fizzy drinks, mars refuel, juice and water.

15.3.10 Habits

No history of nail biting, thumb sucking or parafunctional activities.

15.4 Clinical Examination

15.4.1 Extra-Oral examination(E/O)

A friendly and talkative boy.

Anxious

Symmetrical face.

No regional Lymphadenopathy.

Normal mouth opening with no temporomandibular joint abnormality.

15.4.2 Intra-Oral examination(I/O)

Soft tissue (ST): -

Generalised inflammation of the marginal gingivae with redness, oedema and spontaneous bleeding.

Oral hygiene (OH): poor (plaque index (PI): 89%).

Occlusion:

Class I molar relationship.

Crowding in the upper arch with palatally erupted upper second premolars.

Dentition:

Permanent dentition.

Caries affecting UR6, UR5, UR4, UR2, UR1, UL1, UL2, UL4, UL6, LL6, LL2 and LR6.

Areas of hypomineralisation in the labial surface of UR1 and UL1

Poor prognosis of UR6, UL6, LR6.

Upper occlusal view



Lower occlusal view



Frontal view



Teeth present:

6 5 4 3 2 1	1 2 3 4 5 6
6 5 4 3 2 1	1 2 3 4 5 6

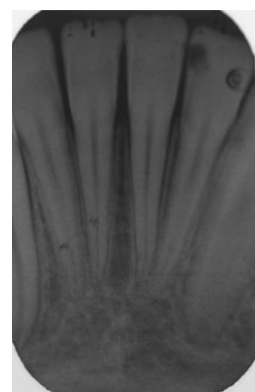
Caries:

6 5 4 2 1	1 2 4 5 6
6	2 6

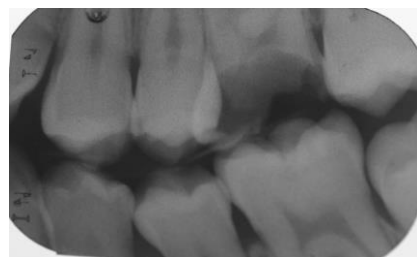
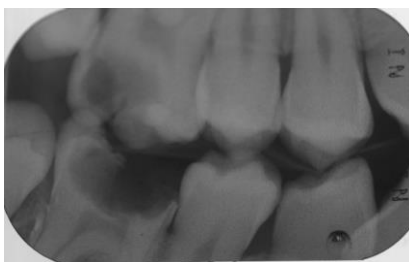
15.4.3 Pre-operative radiographs



Long-cone periapicals



Bitewings



Findings:

Caries affecting UR6, UR2, UR1, UL1, UL2, UL6, LL6, LL2 and LR6.

Radiolucency in the bifurcation area of URD.

Un-erupted second and third permanent molars can be seen.

The second permanent molars reached two third of the root formation.

Limited space between LL4 and LL6 preventing complete eruption of LL5.

15.5 Diagnosis and Treatment Planning

15.5.1 Diagnosis

Caries due to diet and lack of appropriate oral hygiene in a 12 year old child with ADHD.

Generalised plaque-induced gingivitis.

15.5.2 Treatment Objectives

To promote oral preventive measures to prevent further decay and maintain the remaining of permanent dentition.

Improve oral hygiene.

To restore function and aesthetic of his teeth.

To shape his behaviour towards dental care.

15.5.3 Provisional Treatment Plan

Immediate treatment

Temporise UR2, UR1, UL1 and UL2.

Liaise with his paediatrician regarding treatment plan and the need to use local anaesthesia, inhalation sedation and general anaesthesia.

Liaise with Orthodontic department regarding the future treatment plan following extraction of the first permanent molars.

Prevention

OHI.

Dietary education.

Fluoride varnish application (Duraphat Fluoride varnish 2.26%) every 3-4 months.

Fissure seal the premolars.

Behaviour management

To introduce operative dental treatment using non-pharmacological behaviour management techniques.

To do the restorative treatment under inhalation sedation together with local anaesthetic and NPBM techniques.

To extract the first permanent molars under general anaesthesia.

Restoration and extraction

Composite restorations on UR5, UR4, UR2, UR1, UL1, UL2, UL4 and LL2.

Extractions of all first permanent molars.

Maintenance and follow up

Clinical review every 4 months.

Radiographic review every 6-12 months.

Reinforcement of dietary advice and OHI.

Discharge to GDP when dentally stable and caries free.

15.6 Treatment progress and dental management

15.6.1 Visit1 03/12/2012

Attended with his mother.

Seen in new patient clinic.

History was taken, with clinical and radiographic examination.

A provisional treatment plan was formulated and discussed with the mother.

A diet sheet was given.

A letter to his neurodevelopmental paediatrician was sent.

Orthodontic opinion was obtained regarding future orthodontic plan following extracting the first permanent molars:

- To extract all the first permanent molars.
- No orthodontic treatment would be indicated following extraction due to the presence of crowding which would close the majority of the spaces except for the lower right side.
- To monitor the space in the lower right quadrant.
- To refer him to the orthodontic department after one year for re-evaluation.

15.6.2 Visit2 01/02/2013

Attended with his mother.

C/O: food impaction in the back teeth.

MH: No change.

E/O: No abnormalities detected (NAD).

I/O: PI:89%.

Treatment(TX):

Acclimatisation to clinic.

Prophylaxis using prophylactic paste.

UR2, UR1, UL1 and UL2:

Cotton rolls isolation:

Simple excavation using spoon excavator.

Glass Ionomer Cement filling (Fuji IX)

OHLs given:

- Brush twice daily especially at night.
- Duraphat toothpaste with 2800ppm Fluoride prescription.
- Spitting after brushing rather than rinsing.
- Use mouthwash (.05% Fluoride) between brushing.

Fluoride varnish (Duraphat2.26%) applied in his dentition.

Post-operative instructions (POIs).

Discussed the diet sheet with his mother.

Pre-operative clinical photographs.

Behaviour: Anxious, restless and partially co-operative.

15.6.3 Visit3 25/02/2013:

Attended with his mother.

Received a letter from his paediatrician stating that there is no contraindications to dental treatment.

C/O: Nil

MH: No change.

E/O: NAD.

I/O: ST: PI:86%.

TX:

Vitality testing:

Test	tooth			
	UR2	UR1	UL1	UL2
EPT	45	56	42	59
Ethyle chloride	+	+	+	+
Colour	---	---	---	---
TTP & Lateral	---	---	---	---
Mobility	---	---	---	---
Tenderness in the sulcus	---	---	---	---
Sinus	---	---	---	---
Percussion sound	---	---	---	---

Extra and intra-oral photographs.

Written informed consent signed by mother.

IS: Introduction to equipment.

Nitrous Oxide (N₂O) titrated in increments to 35%N₂O:65%O₂.

UR1 and UR2:

-Topical anaesthesia (TA)(20% benzocaine).

-LA administered as infiltration to UR1 and UR2 (3/4 carpule 2.2mL, 2%lidocain with 1:80000 epinephrine) using wand.

-Dry dam isolation.

- removal of temporary filling.

-Caries removal.

-Dycal (hard setting calcium hydroxide) application over dentine covering the pulp.

-Etching, bonding, composite filling (shade: Gradia A1)

100% O₂ for 5 minutes, uneventful recovery.

POIs.

Reinforcement of OHI and mother advised to supervise E while brushing his teeth.

Behaviour: his cooperation improved but still restless and treatment required longer time due to his frequent interruptions.

15.6.4 Visit4 27/03/2013

Attended with his mother.

C/O: Nil.

MH: No change.

E/O: NAD.

I/O: PI:66%.

TX:

IS: Introduction to equipment.

Nitrous Oxide (N₂O) titrated in increments to 35%N₂O:65%O₂.

UL1 and UL2:

- TA.
- LA administered as infiltration to UL1 and UL2 (3/4 carpule 2.2mL, 2%lidocain with 1:80000 epinephrine) using wand.
- Dry dam isolation.
- Removal of temporary filling.
- Caries removal.
- Dycal.
- Etching, bonding, composite filling (shade: Gradia A1)

100% O₂ for 5 minutes, uneventful recovery.

POIs.

Behaviour: his cooperation improved but still restless.

15.6.5 Visit5 19/04/2013

Attended with his mother.

C/O: Nil.

MH: No change.

E/O : NAD.

I/O: PI:33%.

TX:

IS: Introduction to equipment.

Nitrous Oxide (N₂O) titrated in increments to 35%N₂O:65%O₂.

UR4 and UR5:

- Evaluation of stained fissure using low speed round bur.
- Patient felt pain as the cavity reached the dentinoenamel junction.
- TA.
- LA administered as infiltration between UR4 and UR5 (1/2 carpule) using wand.
- Dry dam isolation.
- Caries removal.
- Etching, bonding, composite filling (shade: Gradia A Posterior 1)
- Fissure-sealed the remaining fissures.

100% O₂ for 5 minutes, uneventful recovery.

POIs.

Behaviour: the appointment was short as he coped well. Tell, show and do with appropriate breaks and counting during procedure were used very effectively.

15.6.6 Visit6 08/05/2013:

Attended with his mother.

C/o: Nil.

MH: No change.

E/O: NAD.

I/O: PI:33%.

TX:

IS: Introduction to equipment.

Nitrous Oxide (N₂O) titrated in increments to 35%N₂O:65%O₂.

Dry dam isolation.

UL4:

- Evaluation of stained fissure using low speed round bur.
- Caries removal.
- Etching, bonding, composite filling (shade: Gradia A Posterior 1)
- Fissure-sealed the remaining fissures.

UL4:

- Etching, fissure sealant application.

100% O₂ for 5 minutes, uneventful recovery.

POIs.

Behaviour: restless during drilling but cooperative throughout treatment.

15.6.7 Visit7 23/05/2013

Attended with his mother.

C/O: Nil.

MH: No change.

E/O: NAD.

I/O: PI:5%.

TX:

IS: Introduction to equipment.

Nitrous Oxide (N₂O) titrated in increments to 35%N₂O:65%O₂.

LL2:

- TA
- LA administered as infiltration opposite to LL2 (1/2 carpule) using the wand.
- Dry dam isolation.
- Caries removal.
- Etching, bonding, composite filling (shade: Gradia A1).

LL4,LL5,LR4 and LR5:

- Etching and fissure sealing.

100% O₂ for 5 minutes, uneventful recovery.

POIs.

Post-operative photographs.

Written informed consent for extraction of the first permanent molars.

Behaviour: restless during drilling but cooperative throughout treatment.

15.6.8 Visit 8 22/07/2013

Attended with his mother.

C/O: Nil.

MH: No change.

E/O: NAD.

I/O: No change

TX:

Extraction of first permanent molars under general anaesthesia.

15.6.9 Visit9 22/10/2013

Attended with his mother.

C/O: slight discomfort associated with UL2 andUR2.

MH: No change.

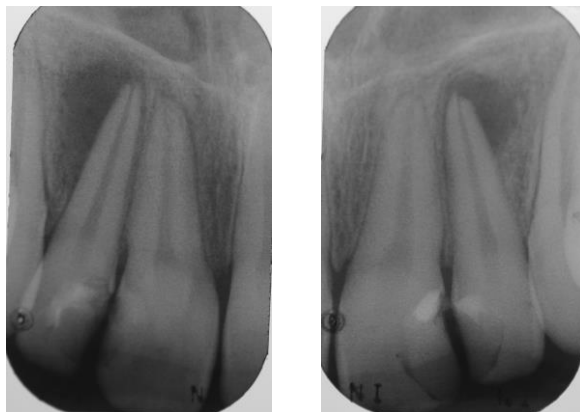
E/O: NAD.

I/O: PI:5%.

Vitality testing

Test	tooth			
	UR2	UR1	UL1	UL2
EPT	80+	28	14	80+
Ethyle chloride	+	+	+	-
Colour	---	---	---	---
TTP & Lateral	+	---	---	+
Mobility	---	---	---	---
Tenderness in the sulcus	---	---	---	---
Sinus	---	---	---	---
Percussion sound	---	---	---	---

Radiographic examination



Long cone periapical radiographs showing periapical radiolucency associated with UR2 and UL2.

TX:

UR2:

- Dry dam isolation.
- Access cavity preparation
- Removal of necrotic pulp tissue
- Irrigation using sodium hypochlorite
- Working length estimation= 23mm
- Drying the canal using paper points size 40
- Dressing using Calcium hydroxide (ultracal)
- Cotton palette and IRM filling.



POIs.

Behaviour: restless during drilling but cooperative throughout treatment.

15.6.10 Visit 10 29/11/2013

Attended with his mother.

C/O: slight discomfort associated with UL2

MH: No change

E/O: NAD

I/O: PI:5%

TX:

IS: Nitrous Oxide (N₂O) titrated in increments to 35%N₂O:65%O₂

UL2:

- Dry dam isolation
- Access cavity preparation
- Removal of necrotic pulp tissue
- Irrigation using sodium hypochlorite
- Working length estimation= 22mm
- Drying the canal using paper points size 40
- Dressing using Calcium hydroxide (ultracal)
- Cotton palette and IRM filling



100% O₂ for 5 minutes, uneventful recovery

Behaviour: restless during drilling but cooperative throughout treatment.

15.6.11 Visit 11 (14/01/2014), 12 (12/02/2014), 13 (21/02/2014), 14 (04/04/2014) and 15 (27/05/2014)

Attended with his mother

C/O: NAD

MH: No change

E/O: NAD

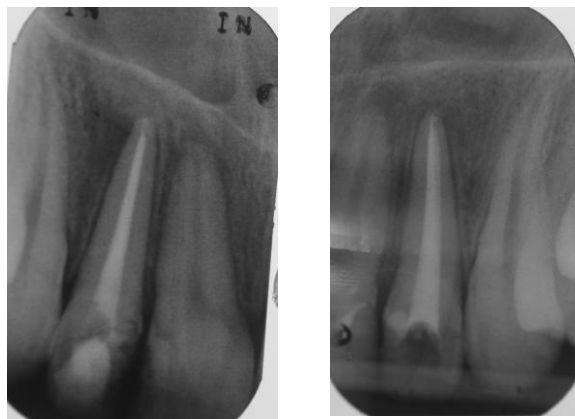
I/O: PI: 0%

TX:

IS: Nitrous Oxide (N₂O) titrated in increments to 35%N₂O:65%O₂

UR2 andUL2:

- Dry dam isolation
- Removal of temporary filling and cotton palette
- Canal cleaning and shaping up to size 50
- Irrigation of the canals using sodium hypochlorite
- Drying the canals using paper points size 40
- Ruth cement applied
- Obturation of the canals using Obtura system
- Cotton palette and IRM filling to close the access cavities
- Post-operative radiographs were taken:



Long cone periapicals showing well condensed GP on both UR2 and UL2

100% O₂ for 5 minutes, uneventful recovery.

Behaviour: Cooperative throughout treatment as we used DVD 3 dimensional glasses which worked very well.

15.6.12 Visit 16 17/06/2014

Attended with his mother.

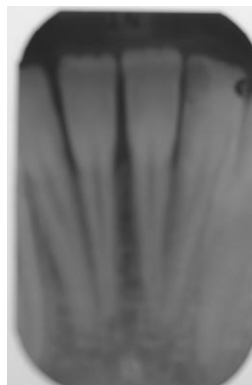
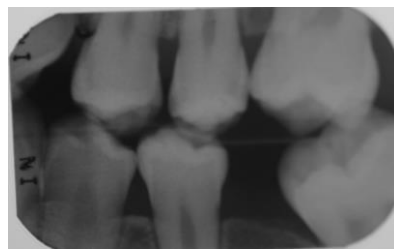
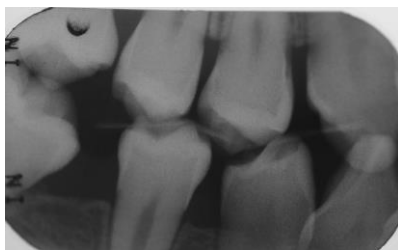
C/O: Nil.

MH: No change.

E/O: NAD.

I/O: PI:5%

Radiographic examination



Right and left bitewings and periapical radiograph showed caries affecting UL5.

TX:

UR2 and UL2:

- Dry dam isolation.
- Removal of temporary filling and cotton palette
- GIC (fuji IX) applied
- Etching, bonding, composite filling (shade: Gradia A1).

UL5:

- Removal of caries
- Etching, bonding, composite filling (Gradia A1)
- Fissure sealed the remaining fissures

UR7, UR5, UR4, UL4, UL7, LL7, LL5, LL4, LR4, LR5 and LR7

- Etching and fissure sealant

POIs.

Re-enforcement of OHI and Diet advice.

Behaviour: Cooperative throughout treatment as we used DVD 3 dimentional glasses which worked very well.

15.7 Post-operative clinical photographs (17/06/2014)

Frontal view



Lower occlusal view



15.8 Appraisal and Discussion

E.S, a 12 years old boy, was diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) when he was 5. It is defined as a life-long neurodevelopmental disorder that often becomes apparent before age seven and characterized by poor impulse control, hyperactivity and inattentiveness (Friedlander *et al*, 2004). It is the most common behavior disorder in school-aged children today (Felicetti *et al*, 2000) and the estimated prevalence is between 3% and 18% with 3:1 to 9:1 male-to-female ratio (Bimstein *et al*, 2008).

Extensive history was obtained from the mother to understand the extent of ADHD and the types of medications he is taking and if he is suffering from any of the drug's side effects. They live in Bedford and travel distance is almost 1 hour and a half. Mother was keen to have treatment done at the Eastman as their local dentist was not able to treat E. Due to the travel distance and cost, different approaches were tried, first by increasing the length of the appointment but E's attention and cooperation was poor toward the end of the appointment. A second approach was tried by splitting the appointment into two parts with a break in between which worked effectively.

Treatment aims were first to prevent and preserve the remaining dentition, improve the oral hygiene and successfully use all the possible behaviour management techniques to do the treatment on chair and shape his attitude toward dentistry.

His behaviour was slightly built up using IS and all the possible NPBM techniques. His mother used rewarding to shape his behaviour at home which was implemented during treatment. One to one model demonstration and involving him during the procedure were useful techniques. He was restless during drilling and that was managed by counting and providing breaks, which in a way, prolonged the time of the treatment.

IS using N₂O has shown a high success rate (Blain and Hill, 1998) and reported to be highly effective in reducing anxiety that can last up to 2 years following treatment (Veerkamp *et al*, 1993). It remains the preferred technique for managing mild to moderate anxiety in paediatric dental patients (Hosey, 2002).

Prevention

E.S. was a high caries risk patient, due to high sugar consumption rate; poor oral hygiene and low Fluoride availability; together with caries experience in permanent teeth which may predict caries in the remaining permanent dentition. Therefore, a vigorous preventive regimen was formulated according to the Department of Health tool kit (Department of Health, 2009).

His diet included high consumption of fizzy drinks and refuel mars drinks with more than 3 snacks per day. Studies have indicated that those affected with ADHD are more likely to consume foods more than five times a day which may increase their exposure to high carbohydrate foods and increasing their risk of developing caries (Blomqvist *et al.*, 2007). He was advised to reduce the amount and frequency of sugary intake during the day and to be limited to mealtimes.

He had very poor oral hygiene in the beginning, which did not improve for the first couple appointment until the mother was asked to supervise it and at that point it improved. It should be noted that children with ADHD function at an age level is about 30% reduced. This means that a 12 year old with ADHD may perform executive functions at a level comparable to that of an 8 year old therefore, they need more support in many daily activities (Blomqvist *et al.*, 2007). Tooth brushing helps in mechanical removal of dental biofilm, which contributes in both gingival disease and caries process. It is also considered a way for Fluoride delivery via toothpaste and had been shown to be effective in dental caries prevention (Marinho *et al.*, 2003). E.S. was encouraged to brush his teeth twice daily especially at night (Chestnutt *et al.*, 1998), and advised to brush for at least 3 minutes (Ashley, 2001). He was provided with a prescription for a 2800ppm toothpaste. He was advised to spit without rinsing after brushing which would reduce the caries by 30% (Ashley *et al.*, 1999) and to use Fluoride mouthrinse daily (0.05% NaF) at a different time to brushing. In addition, Fluoride varnish will be applied professionally every 3-4 months. Improvement in oral hygiene had been noticed toward the end of the treatment.

E.S.'s was considered a high risk patient; therefore it was important to seal his sound premolars to reduce the risk of caries development (Nunn *et al.* 2000). Ahovuo-Saloranta and colleagues concluded their review that taking this measure would reduce caries, where only 27% of the sealed teeth developed caries after 9 years (Ahovuo-Saloranta *et al.*, 2008).

Extracting the first permanent molars was agreed to be undertaken under general anaesthetic as it is complex treatment including multiple teeth together with the presence of the ADHD. All other treatment has been done on chair to minimise the time of general anaesthetic.

Maintenance

E.S. will be reviewed every 3-4 months to check the integrity of the composite filling and sealants, new carious lesion with early minimum intervention, and reinforcement of dietary advice and OHI (Department of Health, 2009). Radiographic review will be every 6-12 months as needed (SDCEP, 2010).

In the appraisal of E.S., he coped very well and was really excited to continue the treatment. Regardless the ADHD, it was really rewarding to see him and his mother trying to improve his oral hygiene and change his life style, which was effective toward the end of the treatment.

15.9 References

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CASE REPORT

Management of dento-alveolar Trauma

Submitted by

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In partial fulfilment of the degree

Clinical Doctorate in Paediatric Dentistry

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20011 - 2014

16 Trauma case summary

M.C is a 9 year old young girl, fit and healthy who suffered trauma to her front teeth. She was immediately seen by her GDP who temporarily dressed her traumatised teeth using GIC.

She was referred to EDH 2 months following the trauma, when her UR1 and UL1 started to become symptomatic. She had one course of antibiotic and was asymptomatic when she first presented at EDH.

Upon examination, UR1 and UL1 were diagnosed as non-vital teeth secondary to uncomplicated enamel-dentine crown fractures.

Treatment provided:

Immediate treatment

Composite filling to restore the aesthetic and the normal height of the tooth.

Extirpation of UR1 and UL1.

Intermediate:

Monitor barrier formation apically in UR1 and UL1.

Long-term:

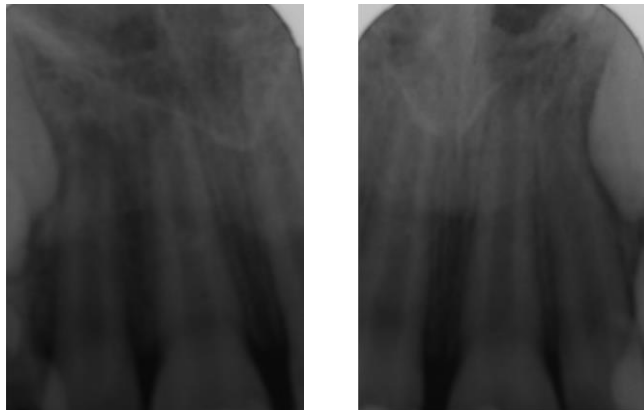
Root canal obturation using gutta purcha.

16.1 Pre-operative clinical photographs (29/11/2011)

Frontal view



Long-cone periapicals



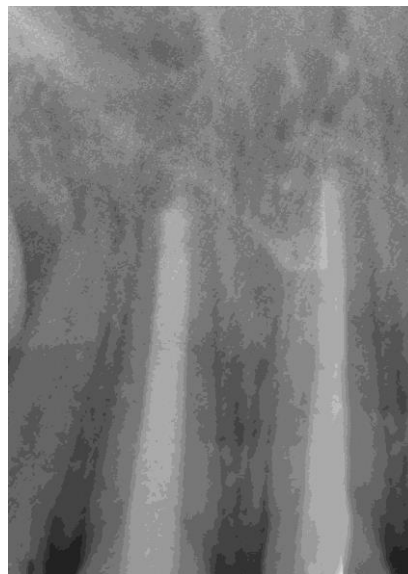
16.2

16.2 Post-operative clinical photographs (03/05/2013)

Frontal view



Long-cone periapicals



16.3 Case History

16.3.1 Personal data:

M.C.

Female.

Date of Birth: 05/01/2003.

Referred by: general dental practitioner (GDP).

Date of first attendance: 29/11/2011.

Age at presentation: 9 years and 10 months.

16.3.2 Reason for referral:

She was referred by her GDP regarding traumatised upper central incisors.

16.3.3 Chief Complaint (C/O)

Asymptomatic.

History of pain:

- Associated with UR1 and UL1.
- Mainly with change in temperature and biting.
- Required painkiller (paracetamol)
- Did not disturbed sleeping.
- Had one course of antibiotic prescribed by GDP (amoxicillin).

16.3.4 History of Complaint

When: 19/9/2011 a.m.

How: she fell down in school and hit the steps. No labial lacerations and the teeth fragments were not located.

Action:

- was taken by mother to her GDP in an emergency appointment .

- Took radiographs and explained finding.
- Covered the teeth by GIC filling.
- Reviewed her after one month when she started to feel pain and referred her to EDH.

Where: outdoor

Other symptoms: Nil

16.3.5 Medical History (MH)

She is a fit and healthy young girl who was born full-term with normal delivery. Her immunisations were up-to-date and did not suffer any early childhood illnesses.

16.3.6 Family History

No family history of any dental abnormalities.

16.3.7 Social History

She has two sisters and two brothers, and she is the youngest.

She attends main stream school.

Year 4 in school.

16.3.8 Dental History

M was a regular attendee to her GDP (6-monthly). She had fillings before under local anaesthesia (LA). There was no history of GA or Fluoride supplement use.

16.3.9 Oral Hygiene

She brushes twice daily with adult's toothpaste and a manual toothbrush.

16.3.10 Diet

She was a good eater and liked a variety of food. Occasionally consumed sweets and crisps between meals and mainly drinks water.

16.3.11 Habits

No history of nail biting, thumb sucking or parafunctional activities.

16.4 Clinical Examination

16.4.1 Extra-Oral examination(E/O)

A friendly young girl.

Avoid smiling.

Symmetrical face.

No regional Lymphadenopathy.

Normal mouth opening with no Temporomandibular joint abnormality.

16.4.2 Intra-Oral examination(I/O)

Soft tissue (ST):

- No abnormality detected (NAD).

Oral hygiene (OH):

Good (plaque index (PI): 17%) (Simplified oral hygiene index by Green and Vermilion 1964).

Occlusion:

Permanent molar relationship: class I on the right and left sides.

Mild crowding in the upper anterior segment.

Limited space in the canine-premolars area (referred to orthodontist by her GDP).

Dentition:

Mixed dentition.

Fissure sealed first permanent molars.

Composite filling on URE.

Amalgam filling in LLE.

Tooth surface loss URC, URD and LRC.

Trauma findings:

UR1: Uncomplicated enamel-dentine crown fracture, covered with GIC.

UL1: Uncomplicated enamel-dentine crown fracture.

Vitality testing:

test	tooth			
	UR2	UR1	UL1	UL2
EPT	45	80	80	39
Ethyle chloride	+	---	---	+
Colour	---	---	---	---
TTP & Lateral	---	+	+	---
Mobility	---	---	---	---
Tenderness in the sulcus	---	---	---	---
Sinus	---	---	---	---
Percussion sound	---	---	---	---

Frontal view



Upper and lower occlusal view



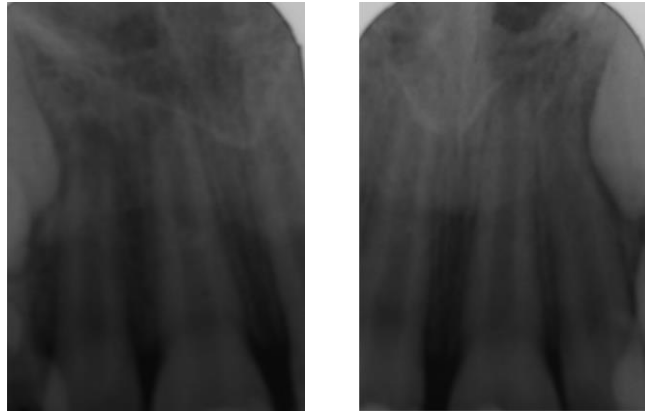
Teeth present:

6 E D C 2 1	1 2 C 4 6
6 E C 2 1	1 2 E 6

16.4.3 Pre-operative radiographs

Long cone periapicals

29/011/2011



Findings:

Immature roots of UR1 and UL1.

No obvious signs of periapical pathology.

16.5 Diagnosis and Treatment Planning

16.5.1 Diagnosis

UR1 and UL1: non-vital upper UR1 and UL2 secondary to uncomplicated enamel-dentine crown fracture.

16.5.2 Treatment Objectives

Extirpate the upper central incisor as soon as possible.

To restore function and aesthetic.

To preserve the traumatised teeth.

Prevent/ manage the sequelae of the trauma as appropriate.

16.5.3 Provisional Treatment Plan

Immediate treatment

Composite filling to restore the aesthetic and the normal height of the tooth.

Extirpation of UR1 and UL1.

Intermediate:

Monitor barrier formation apically in UR1 and UL1 and Ca(OH)_2 .

Long-term:

Root canal obturation using gutta purcha.

16.6 Treatment progress and dental management

16.6.1 Visit1 29/11/2011

Attended with her mother.

Treatment (TX):

Attended in new patient clinic.

History and examination.

Clinical photographs.

Intra-oral radiographs.

Provisional treatment plan was formulated and explained to M and her mother.

They were informed about the possible sequelae associated with trauma.

Behaviour: very cooperative.

16.6.2 Visit2 05/12/2011

Attended with his mother.

C/O: no symptoms.

E/O: NAD.

I/O: no change.

• **Tx:**

UR1, UL1, UL2

Dry dam isolation

Etching, bonding, composite build-up (shede: Gradia AO1, A1, A2).

Access cavity preparation (palatal).

Removal of pulp tissue (necrotic).

Canals irrigation with sodium hypochlorite (0.5%).

X-ray was taken with a size 40 K-files to determine working lengths (WL).

WL determination (UR1= 23.5, UL1=23.5mm).

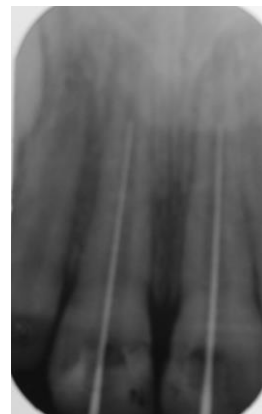
Drying of the canals using paper points size 60.

Non-setting calcium hydroxide dressing $\text{Ca}(\text{OH})_2$, Ultracal used for canals dressing.

Cotton pledget + IRM used to close access cavities of these teeth.

POIs.

Behaviour: very cooperative.



16.6.3 Visit3 31/01/2012:

Attended with her mother.

C/O: no symptoms.

E/O: NAD.

I/O: NAD

Tx:

UR1, UL1

Dry dam isolation

Removal of temporary filling and cotton pledget from access cavities.

Canals irrigation with sodium hypochlorite (0.5%).

No barrier felt.

Radiographs was taken showed open apices and no associated pathologies associated with UR1 and UL1.

Drying of the canals using paper points size 60.

Non-setting calcium hydroxide dressing Ca(OH)_2 , Ultracal used for canals dressing.

Cotton pledget + IRM used to close access cavities of these teeth.

POIs .

Behaviour: very cooperative.

16.6.4 Visit4 01/05/2012

Attended with her mother.

C/o: no symptoms.

MH: No change.

E/O: NAD.

I/O: PI:0%.

TX:

UR1, UL1

Dry dam isolation

Removal of temporary filling and cotton pledget from access cavities.

Canals irrigation with sodium hypochlorite (0.5%).

No barrier felt.

Radiographs was taken showed open apices and no associated pathologies associated with UR1 and UL1.

Drying of the canals using paper points size 60.

Non-setting calcium hydroxide dressing $\text{Ca}(\text{OH})_2$, Ultracal used for canals dressing.

Cotton pledget + IRM used to close access cavities of these teeth.

POIs .

Behaviour: very cooperative.

16.6.5 Visit5 30/11/2012

Attended with her mother.

C/O: Nil.

MH: No change.

E/O: NAD.

I/O: PI:0%.

TX:

UR1, UL1

Dry dam isolation

Removal of temporary filling and cotton pledget from access cavities.



Canals irrigation with sodium hypochlorite (0.5%).

Barrier felt.

Radiographs was taken to confirm working length (UR1=25 and UL1=25.5mm).

Canal preparation.

Drying of the canals using paper points size 60.

Non-setting calcium hydroxide dressing Ca(OH)_2 , Ultracal used for canals dressing.

Cotton pledget + IRM used to close access cavities of these teeth.

POIs .

Behaviour: very cooperative.

Patient cancelled two appointments.

16.6.6 Visit6 03/05/2013

Attended with her mother.

C/O: Nil.

MH: No change.

E/O: NAD.

I/O: PI:0%.

TX:

UR1, UL1

Dry dam isolation

Removal of temporary filling and cotton pledget from access cavities.

Canals irrigation with sodium hypochlorite (0.5%).

Canals were obturated with GP and canal sealer (zinc oxide eugenol, Roth canal cement, Roth international LTD, Chicago, USA) using thermoplastic obturation (Obtura) technique.

Cotton pledget + IRM used to close access cavities of these teeth.

POIs .

Behaviour: very cooperative.

16.6.7 Visit 7 (15/06/2013)

Attended with her mother.

C/O: Nil.

MH: No change.

E/O: NAD.

I/O: PI:0%.

TX:

UR1, UL1

Dry dam isolation

Removal of temporary filling and cotton pledget from access cavities

GIC (Fuji IX) placed over GP

Etching, bonding, composite filling to close the access cavity (shade: Gradia A1)

Finishing and polishing using diamond burs

Upper and lower alginate impressions for sportguard

POIs .

Behaviour: very cooperative.

16.6.8 Visit 8 (29/06/2013)

Attended with her mother.

C/O: Nil.

MH: No change.

E/O: NAD.

I/O: PI:0%.

TX:

Delivery of sportguard

POIs

Vitality testing:

test	tooth			
	UR2	UR1	UL1	UL2
EPT	45	N/A	N/A	39
Ethyle chloride	+	N/A	N/A	+
Colour	---	---	---	---
TTP & Lateral	---	---	---	---
Mobility	---	---	---	---
Tenderness in the sulcus	---	---	---	---
Sinus	---	---	---	---
Percussion sound	---	---	---	---

Behaviour: very cooperative.

16.6.9 Visit 9 (15/12/2013) and 10 (10/05/2014)

Patient was reviewed in 6 months and 12 months.

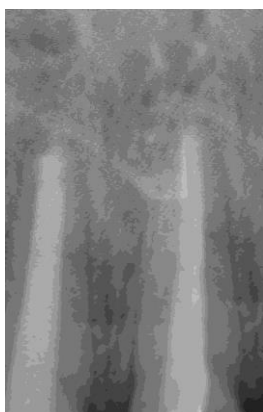
Upper central incisors were stable with no clinical or radiographic signs of pathology.

Upper lateral incisors were responding to vitality testing with no obvious signs of pathology.

Patient was discharged back to her local dentist for regular check-ups.

16.7 Post-operative clinical photographs (10/05/2014)

Frontal view



16.8 Appraisal and Discussion

Traumatic dental injuries (TDI) in children and adolescents are considered a dental public health problem due to their high prevalence worldwide (Bastone et al., 2000). The prevalence of dental trauma varies between countries, ranging from 4.1% to 58.6% for the permanent dentition. Crown fracture occur more commonly in the permanent dentition (Flores *et al.*, 2007). In the majority of TDIs, the central incisors are affected and comprise 73% of all injuries (Roberts and Longhurst, 1996).

M.C., a nine years old young girl, was referred from her GDP regarding traumatised upper central incisors. Emergency treatment involving dressing the traumatised teeth had been provided by her GDP.

When she first presented at the EDH, she was diagnosed with the following:

UR1 and UL1: non vital upper central incisors secondary to uncomplicated enamel-dentine crown fracture.

The ideal treatment for uncomplicated enamel-dentine crown fracture is to seal the opened dentinal tubule to prevent bacterial invasion to the pulp tissue. The success rate and the chance for the pulp tissue to remain vital in immature permanent dentition is 95% (Andersson *et al.*, 2012). Although M's dentist did cover her teeth however, her teeth became non-vital.

The aim of the treatment was to extirpate the UR1 and UL1 as soon as possible to remove the source of pain and infection, to enhance barrier formation, proper sealing of the root canal using GP and preserve the tooth for as long as possible.

So our immediate aim at that stage was to minimise the infection and the amount of resorption in order to improve the prognosis and maintain the maximum amount of permanent dentition².

Pulp extirpation and Ca(OH)_2 used for that purpose to achieve disinfection and promote the formation of apical barriers (Sheehy *et al.*, 1997) which allowed conventional root canal treatment to be carried out on UR1 and UL1. The root canals

of UR1 and UL1 were obturated with gutta percha using the thermoplastic technique. There is no evidence to suggest thermoplastic technique is superior to cold condensation technique, however, it require less time when compared with lateral condensation (Ping *et al*, 2007). The obturation was homogenous and created a good apical seal. The prognosis for the UR1 and UL1 was good in terms of controlling inflammatory resorption and providing an apical seal.

The consequences of trauma to her permanent upper anterior were explained to M and her mother, highlighting discolouration, pain, infection, resorption, ankylosis, losing the composite filling and in the worse cases, losing one or more of the traumatised teeth.

M was reviewed up to 12 months following her trauma with no evidence of clinical or radiographic pathologies associated with her upper central incisors. Therefore, she was discharged back to her general dentist.

Appraisal: M.C. was happy with the colour of her teeth and pleased with the results. The UR1 and UL1 had been successfully endodontically treated with no clinical evidence of treatment failure.

16.9 References

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